HARRIS®

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6800/7000 Series

Distribution and Routing Products

Installation and Operation Manual

◆LEITCH®

A brand of Harris Corporation

6800/7000 Series Distribution and Routing Products

Installation and Operation Manual

Edition B
February 2003

◆LEITCH®

Preface

Purpose

This manual details the features, installation procedures, operational procedures, and specifications of the 6800/7000 Series - Distribution and Routing Products.

Audience

This manual is written for technicians and operators responsible for installation, setup, and/or operation of the 6800/7000 Series - Distribution and Routing Products.

Writing Conventions

To enhance your understanding, the authors of this manual have adhered to the following text conventions:

Bold	Indicates dialog box, property sheet, field, button, checkbox, listbox, combo box, menu, submenu, window, list, and selection names.
Italics	Indicates email addresses, names of books and publications, and first instances of new terms and specialized words that need emphasis.
CAPS	Indicates a specific key on the keyboard, such as ENTER, TAB, CTRL, ALT, DELETE.
Code	Indicates variables or command-line entries, i.e., a DOS entry, something you type into a field, etc.
>	Indicates direction of navigation through a hierarchy of menus and windows.
hyperlink	Indicates a jump to another location in the document or elsewhere (such as a website).

Revision History

Edition	Date	Revision History
A	May 1998	Initial release.
B	February 2003	• Updated information. • General reformatting and reorganization of material.

Summary of the 6800/7000 Series Product Manuals

Audio/Video/Mux and Demultiplexing Manual	
Chapter 1	ADC-6801 CAV to SDI Converter Module
Chapter 2	ADC-6880 Analog to AES/EBU Digital Converter
Chapter 3	ADM/ASM-680x Embedded Audio Monitoring Module
Chapter 4	DAC-6801 Digital to Analog Component Converter
Chapter 5	DAC-6880 AES/EBU Digital Audio to Analog Audio Converter
Chapter 6	DEC-6801/DES-6801 Decoder/Decoder with Frame Synchronizer Module
Chapter 7	DEC-6804 Decoder and DES-6804 Decoder with Frame Synchronizer
Chapter 8	ENC-ENS/ENX-6801A Encoder Modules
Chapter 9	MXA-6800-AES and MXA-6801-A2/A4 Audio Multiplexer Module
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Chapter 2	VTG-6801-2 Serial Digital Test Generator Module
Chapter 3	DAR-6880 AES/EBU Digital Audio Reference and Tone Generator
Chapter 4	SAI-6800 4:2:2 Safe Area Generator/Inserter Module
Chapter 5	VTG-6800 MIXBOX Frame and Control Assembly
Chapter 6	EDH-6800MB Detection and Handling MIXBOX

Distribution and Routing Manual

Chapter 1	AES-6880 AES/EBU Digital Audio Distribution Amplifier Module - General
Chapter 2	DNH-6800 DigiNet Hub Module
Chapter 3	EDH-6800-2EDH Detection/Insertion Serial Distribution Amplifier Module
Chapter 4	USM-6800 PAL/NTSC Monitoring Encoder Module
Chapter 5	VDA-6830 Video Distribution Amplifier Module
Chapter 6	VEA-6830 Video Equalizing Amplifier Module
Chapter 7	VEA-6840 Video Equalizing Amplifier Module
Chapter 8	VPD-6830 Programmable Video DA series
Chapter 9	VSD-6801 Serial Digital Distribution Amplifier Module
Chapter 10	VSE-6801 Serial Equalizing Amplifier Module
Chapter 11	VSE-6802 Serial Equalizing Distribution Amplifier
Chapter 12	VSM-6802 Digital Composite Video Signal
Chapter 13	VSM-6804 Digital Composite Video Signal Monitor Module
Chapter 14	VSR-4041 Serial Video Router Module

LogoMotion Manual

Chapter 1	Logo Utilities for 6800 Series Modules
Chapter 2	LGI-6801 Serial Digital Logo Generator/Inserter Module
Chapter 3	VES-6801 Flash EPROM Side Module
Chapter 4	DSK-6801/3 Downstream Serial Keyer
Chapter 5	DSK-CP1/2 Downstream Serial Keyer Control Panel

Frames and Power Supply Manual	
Chapter 1	Mounting Frames
Chapter 2	FR-6801/FR-6801-1 Frames
Chapter 3	FR-6804/FR-6804-1 Frames
Chapter 4	CF-6801 Cooling Frame
Chapter 5	FR-7001 and FR-7000MB MIXBOX
Chapter 6	6801PS Power Supply Module
Chapter 7	6804(-1) Power Supply Module
Chapter 8	7000 Power Supply Module
Chapter 9	6801PS-48 Power Supply Module
Chapter 10	6804PS-1-48 Power Supply Module

Unpacking/Shipping Information

This product has been carefully inspected, tested and calibrated before shipment to ensure years of stable and troublefree service. Please check the equipment for any visible damage which may have occurred during transit.

Please confirm that all items listed on the packing list have been received. If any item on the packing list is missing, please contact your Leitch dealer. If any item is damaged please contact the carrier. Ensure that all packaging material is removed from the product and its associated components before installing the unit.

It is suggested that you keep at least one set of original Leitch packaging, in the event that a product needs to be returned for service. If the original packaging is not available, you can purchase replacement packaging from Leitch at a modest cost or supply your own packaging as long as it meets the following criteria:

- Packaging must be able to withstand the product weight.
- Product must be held rigid within the packaging.
- There must be at least two inches of space between the product and the container.
- The corners of the product must be protected.

Products that are being returned to Leitch for servicing should be shipped pre-paid in the original packaging material if possible. If the product is still within the warranty period, the product will be returned by pre-paid shipment after servicing.

Installation Information

If this product is rack mountable, it should be mounted in an appropriate rack using the rack mounting positions and rear support guides provided. It is recommended that each frame be connected to a separate electrical circuit for protection against circuit overloading. If this product relies on forced air cooling, it is recommended that all obstructions to the air flow be removed prior to installing the frame in the rack.

If this product has a provision for external earth grounding, it is recommended that the frame be grounded to earth via the protective earth ground on the rear panel.

Important Safety Instructions

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. Read these instructions. Keep these instructions. Heed all warnings. Follow all instructions.

Servicing

Only qualified personnel should perform service procedures. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Safety Terms and Symbols

Terms and Symbols in This Manual

⚠ WARNING:
Statements identifying conditions or practices that can result in personal injury or loss of life: High voltage is present. Uninsulated dangerous voltage within the product's enclosure may be sufficient to constitute a risk of electric shock to persons.

⚠ CAUTION:
Statements identifying conditions or practices that can result in damage to the equipment or other property: Important operating and maintenance (servicing) instructions in the literature accompanying the product.

Terms and Symbols on the Product

⚠ DANGER:
High voltage and indicates a personal injury hazard immediately accessible as one reads the marking.

⚠ WARNING:
Indicates a personal injury hazard not immediately accessible as one reads the marking.

⚠ CAUTION:
Indicates a hazard to property including the product or to take attention and refer to the manual.

Protective ground (earth) terminal.

Fuse:
Replace with same type and rating of fuse.

Observe precautions for handling electrostatic-sensitive devices.

Injury Precautions

WARNING!
To reduce the risk of electric shock, do not expose this apparatus to rain or moisture.
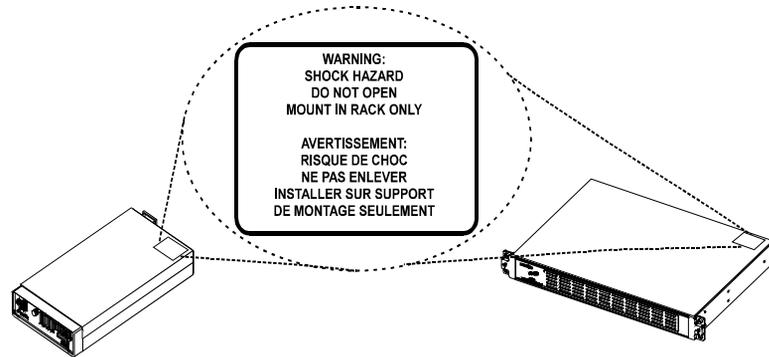
CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

WARNING!
Potentially lethal voltages are present within this product's frame during normal operation. The AC power cord must be disconnected from the frame before the top panel is removed. (In frames with multiple power supplies, remove ALL power cords.) Power should not be applied to the frame while the top is open, unless properly trained personnel are servicing the unit.

[PL Poland] Przod zdjeciem pokrywy wyciagnac wtyczke z gniazda sieciowego.

[French] AVIS: RISQUE DE CHOC ELECTRIQUE - NE PAS OUVRIR. INSTALLER SUR SUPPORT DE MONTAGE SEULEMENT.

WARNING:
SHOCK HAZARD
DO NOT OPEN
MOUNT IN RACK ONLY

AVERTISSEMENT:
RISQUE DE CHOC
NE PAS ENLEVER
INSTALLER SUR SUPPORT
DE MONTAGE SEULEMENT

WAARSCHUWING:
SCHOK GEVAAR
NIET OPEN MAKEN
ALLEEN IN RAK MONTER

AVVISO:
PERICOLO DI CORRENTE
E PROIBITO L'APERTURA
SI PREGA DI FARE IL MONTAGGIO
AL PROPRIO SOPPORTO

FIGYELEM:
ÁRAMÜTÉS VESZÉLY
CSAK A MEGTELELÖ
TARTÓKERETBE ÜZEMBEHELYEZNI

ADVARSEL:
MULIGHED FOR ELEKTRISK STØD
INDEHOLDER STRØMFØRENDE DELE
APPARATET MÅ KUN ÅBNES AF
KVALIFICERET.
SKAL INSTALLERES I JORDET RACK

ATENÇÃO:
PERIGO DE CHOQUE
SO PARA MONTAGEM
EM BASTIDOR

注 意 ：
請 勿 打 頂 板 以 免 觸 電
該 設 備 須 放 在 機 櫃 中 使 用

경 고   전기 충격 위험 가능   열지 마십시오

WARNUNG:
SCHOCK GEFAHR
NICHT ÖFFNEN
NUR IN DAS GESTELL MONTIEREN

UWAGA:
GROZI PORAZENIEM
NIE OTWIERAC
MONTOWAC TYLKO W RAMIE

VARNING:
FARA FÖR ELEKTRICITETNEM KINYITNI
ÖPPNA EJ
MONTERES ENDAST I RACK

ADVERTENCIA:
PELIGRO DE DESCARGA ELÉCTRICA
NO ABRIR EL EQUIPO
SOLO PARA INSTALAR EN RACK

ΠΡΟΕΙΔΠΟΙΗΣΗμ
ΚΙΝΔΗΝΟΣ ΗΛΕΚΤΡΟΠΛΗΞΙΑΣ
ΜΗΝ ΑΝΟΙΓΕΤΕ
ΤΟΠΟΘΕΤΕΙΣΤΕ ΜΟΝΟ ΣΕ ΚΑΤΑΛΛΗΛΟ
ΉΠΟΣΤΗΡΙΓΜΑφîΧ ΠπψΤψ

ТРЕДУПРЕЖДЕНИЕ:
Электрический опаность не открыте.
Монтироваете в ракете только.

AVIS - Risque de choc electrique. Ne pas
ouvrir.

Use Proper Power Cord
To avoid fire hazard, use only the power cord specified for this product.

Ground the Product
Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. When the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

[United Kingdom] WARNING: THIS APPLIANCE MUST BE EARTHED.

[Sweden] APPARATEN SKALL ANSLUTAS TILL JORDAT UTTAG NÄR DEN ANSLUTS TILL ETT NÄTVERK.

Do Not Operate Without Covers
To avoid electrical shock or fire hazard, do not operate this product with covers or panels removed.

Use Proper Fuse
To avoid fire hazard, use only the fuse type and rating specified for this product.

Do Not Operate in Wet/Damp Conditions
To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture

Do Not Operate in an Explosive Atmosphere
To avoid injury or fire hazard, do not operate this product in an explosive atmosphere.

Avoid Exposed Circuitry
To avoid injury, remove jewelry such as rings, watches, and other metallic objects. Do not touch exposed connections and components when power is present.

Product Damage Precautions

Use Proper Power Source
Do not operate this product from a power source that supplies more than the specified voltage.

Use Proper Voltage Setting
Before applying power, ensure that the line selector is in the proper position for the power source being used.

Provide Proper Ventilation
To prevent product overheating, provide proper ventilation.

Do Not Block Any Ventilation Openings
Do not block any of the ventilation openings. Install in accordance with the manufacturer's instructions.

Only Use Attachments/Accessories Specified by the Manufacturer

Do Not Operate With Suspected Failures
Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

For Products with Multiple Power Cords:
CAUTION: This unit can have more than one power supply cord. To de-energize the internal circuitry, disconnect all power cords before servicing.

[Norwegian] ADVARSEL: Utstyret kan ha mere ennn en tilførselsledning. For å gjore interne deler spennigsløse må alle tilførselsledningene trekkes ut.

[Sweden] VARNING: Denna apparat har mer än en nätanslutning. Samtliga nätkablar måste bortkopplas för att göra de interna kretsarna spänningsfria.

Do not use this apparatus near water
Do not expose this apparatus to dripping or splashing water.
Ensure that no objects filled with liquid, such as vases or cups, are
placed on the apparatus.

Clean only with a dry cloth

Keep Product Away from Heat Sources
Do not install near any heat sources such as radiators, heat registers,
stoves, or other apparatus (including amplifiers) that produce heat.

Install Near Socket Outlet
The equipment shall be installed near the socket outlet, and a
disconnect device shall be easily accessible.

Protect the Power Cord
Protect the power cord from being walked on or pinched
particularly at plugs, convenience receptacles, and the point where
they exit from the apparatus.

Unplug this Apparatus During Lightning Storms
Unplug this apparatus during lightning storms or when unused for
long periods of time. Note: A UPS or power surge suppressor could
be used as an alternative.

Attention:
Observe precautions for handling electrostatic-sensitive devices.See
"Preventing Electrostatic Discharge" below for details.

Fuse Replacement:
CAUTION: FOR CONTINUED PROTECTION AGAINST RISK
OF FIRE, REPLACE ONLY WITH THE SAME TYPE OF FUSE.
[French]ATTENTION: REMPLACER UNIQUEMENT PAR UN
FUSIBLE DE MEME TYPE.

Battery Use Warnings

⚠ CAUTION:
DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY
PLACED. REPLACE ONLY WITH THE SAME OR
EQUIVALENT TYPE RECOMMENDED BY THE
MANUFACTURER. DISCARD USED BATTERIES ACCORDING
TO THE MANUFACTURER'S INSTRUCTIONS.

[FI Finland] VAROITUS: Paristo voi rajahtaa, jos se on
virheellisesti asennettu. Vaihda paristo ainoastaan valmistajan
suosittelemaan tyyppun. Havita kaytetty paristo valmistajan
ohjeiden mukaisesti.

[SE Sweden] VARNING: Explosionsfara vid felaktigt batteribyte.
Anvand samma batterityp eller en eller en ekvivalent typ som
rekommenderas av tillverkaren. Kassera anvant batteri enligt
fabrikantens instruktion.

[D Denmark]

Advarsel! Lithiumbatteri. Eksplosionsfare ved
fejlagtig handtering. Udskiftning ma kun ske med
batteri af samme fabrikat oq type. Lever det
brugte batteri tilbage till leverandoren.

[KO Korean]

경고
만약 틀린 전지로 교환했을 경우, 폭발 위험이 가능합니다.
똑같거나, 동등한 종류와 교체하는 것을 제조엄자로서 권장합니다.
제조엄자의 지시에 따라, 사용된 전지는 버려 주십시오.

Preventing Electrostatic Discharge

CAUTION: Electrostatic discharge (ESD) can damage components in the product. To prevent ESD, observe these precautions when directed to do so:

- Use a Ground Strap. Wear a grounded antistatic wrist strap to discharge the static voltage from your body while installing or removing sensitive components.

- Use a Safe Work Area. Do not use any devices capable of generating or holding a static charge in the work area where you install or remove sensitive components. Avoid handling sensitive components in areas that have a floor or benchtop surface capable of generating a static charge.

- Handle Components Carefully. Do not slide sensitive components over any surface. Do not touch exposed connector pins. Handle sensitive components as little as possible.

- Transport and Store Carefully. Transport and store sensitive components in a static-protected bag or container.

Certifications and Compliances

This product has been tested and found to comply with the following CE, FCC, UL, ICES and CSA standards:

EMC Standards

EN55014	Limits and methods of measurement of radio disturbance characteristics of electric motor-operated and thermal appliances for household and similar purposes, electric tools and similar electric apparatus.
EN55022	Limits and methods of measurement of radio disturbance characteristics of information technology equipment Class A.
EN55103-1	Electromagnetic compatibility—Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use, Part 1: Emission, Environment E4.
EN55103-2	Electromagnetic compatibility—Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use, Part 2: Emission, Environment E4.
EN61000-4-2	Electrostatic discharge requirements "ESD" 2kV CD,4kV AD.
EN61000-4-3	Radiated radio-frequency electromagnetic field immunity test 1V/m {1kHz 80% AM, 80-1000MHz}.
EN61000-4-4	Electrical Fast transient requirements "Burst", 0.5kV Sig. & Ctrl. Lines 0.5kV a.c. & d.c. Power line, 0.5kV functional earth.
EN61000-4-5	Surge Immunity test 0.5kV a.c. Power line.
EN61000-4-6	Immunity to conducted disturbances induced by radio frequency fields 1V rms 0.15-80MHz Sig. & Ctrl. Lines, 3V rms 0.15-80MHz d.c. Power line, 1V rms 0.15-80MHz a.c. Power line, 1V rms 0.15-80MHz functional earth.
EN61000-4-11	Voltage dips, short interruptions and voltage variations-immunity tests.

per the provision of the Electromagnetic Compatibility Directive 89/ 336/EEC of 3 May 1989 as amended by 92/31EEC of 28 April 1992 and 93/68/EEC, *Article 5* of 22 July 1993.

These devices are for professional use only and comply with Part 15 of FCC rules. Operation is subject to the following two conditions:

1. These devices may cause interference to Radio and TV receivers in residential areas

2. These devices will accept any interference received, including interference that may cause undesired operations.

These devices do not exceed the class A limits for radio noise emissions from digital apparatus as set out in the interference standard entitled "Digital apparatus", ICES-003 of the Canadian Department of Communications.

Safety Standards

EN60065	Safety requirements for mains operated electronic and related apparatus for household and similar general use [IEC 60065: 1985, 5th Edition + A1: 1987 + A2: 1989 + A3: 1992, (modified)], per the provision of the Low-Voltage Directive 73/23/EEC of February 19, 1973, as amended by 93/68/EEC.
UL 1419 CSA C22.2 No. 1	Safety requirements for audio, video and similar electronic equipment.

Safety Standards (6801PS-48) Only

EN 60950-1992	Safety of information technology equipment, including electrical business equipment (Amendments A1: 1993, A2: 1993, A3: 1995, A4: 1997), per the provision of the Low-Voltage Directive 73/23/EEC of February 19, 1973 as amended by 93/68/EEC.
UL 1950	Safety of information technology equipment, including electrical business equipment.
CSA C22.2 No.95095	Safety of information technology equipment, including electrical business equipment.

Safety Standards: (6801PS-1-48) Only

EN 60950-2000	Safety of information technology equipment, including electrical business equipment (IEC-60950:1999), per the provision of the Low-Voltage Directive 73/23/EEC of February 19, 1973 as amended by 93/68/EEC.
UL 1950	Safety of information technology equipment, including electrical business equipment.
CSA C22.2 No.950	Safety of information technology equipment, including electrical business equipment.

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Chapter 1

AES-6880 AES/EBU Digital Audio Distribution Amplifier Module

Overview

The AES-6880 is a differential input, eight output; AES/EBU digital audio distribution amplifier. Using Coaxial Cable, The AES-6880 digital audio distribution amplifier features cable auto-equalization, data reclocking, and incoming data error detection and reporting.The error detection and reporting features utilize front-mounted LEDs and an external alarm contact closure.

Housed in either an FR-6800 or FR-7000 series frame, the AES-6880 meets interface standards according to SMPTE 276M.

Specifications and designs are subject to change without notice.

Board Layout and Functionality

The following diagrams show the layout and functionality of the AES-6880 board.
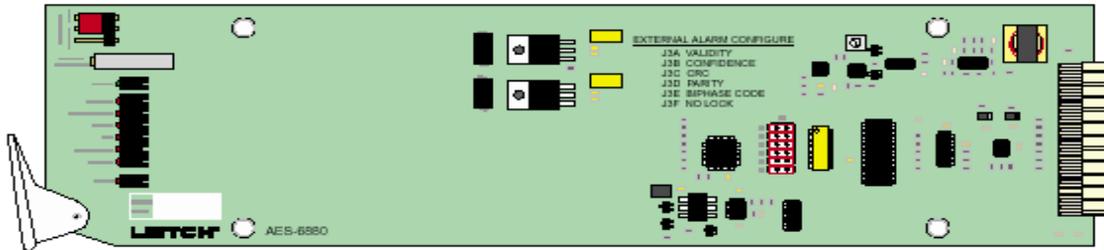
Figure 1-1. AES-6880 Printed Circuit Board

Functional Block Diagram
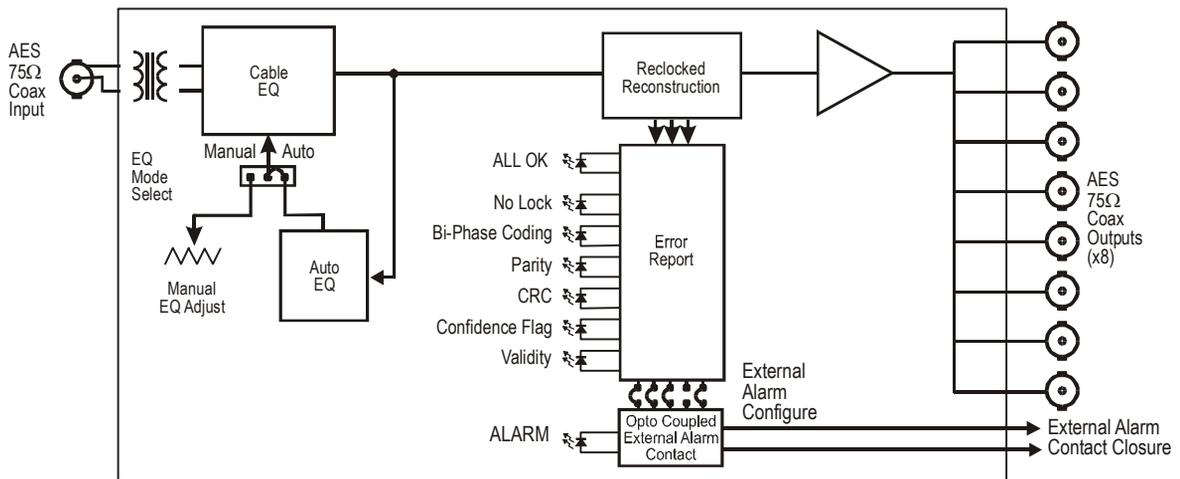
Figure 1-2. AES-6880 Functional Block Diagram

Equalization Adjustment

The AES-6880 distribution amplifier provides two options for equalization adjustment: **Manual** and **Automatic**. The mode is selected using jumper **J1** near the front edge of the DA card. *See* Figure 1-3 on page 4 for jumper location.

Manual Equalization

In **Manual** adjust mode, a card-edge, multi-turn potentiometer (R19) is used for adjusting equalization. The **Confidence** flag warning on the card-edge LED is used to determine the amount of equalization required without external test equipment. If the **Confidence** flag error LED is on, then more equalization is needed.

To increase the amount of equalization, simply use a screwdriver to turn the **Manual** equalization adjustment potentiometer (**R19)** clockwise until the **Confidence** LED indicator turns off. *See* Figure 1-3 on page 4 for potentiometer location.

Automatic Equalization

> 📝 **Note**
>
> The factory default configurations for J1 is in the "**Auto**" position, and the **Manual** equalization adjustment potentiometer (**R19**) is set for zero compensation.

In **Automatic** adjust mode, the distribution amplifier automatically sets the amount of cable equalization needed. This mode eliminates the need to re-adjust equalization if another distribution amplifier is installed or exchanged, or if the cable length changes.

The equalization is designed for using 2000 ft (600 m) of Belden 8281 cable or the equivalent. In practice, if the incoming signal is a standard AES signal for coaxial cable systems, this DA can compensate up to 6000 ft (1800 m) of Belden 8281 cable or equivalent.
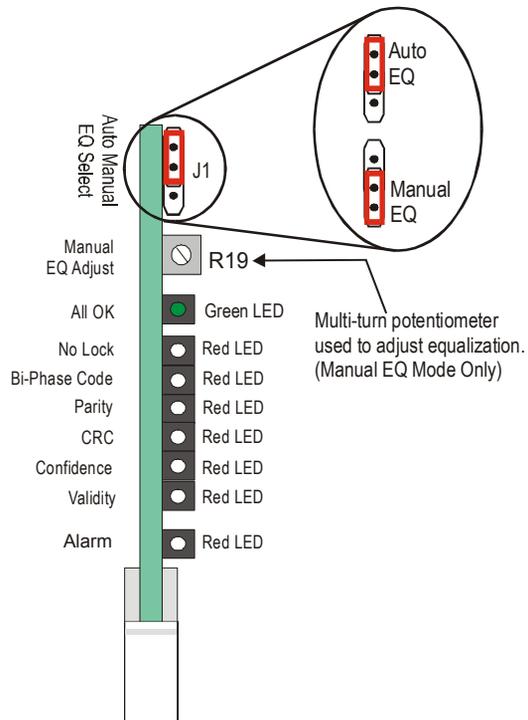
Figure 1-3. AES-6880 Card-Edge View

Error Detection and Reporting

The AES-6880 DA constantly monitors the incoming AES data stream and reports the following error conditions via the LED indicators mounted near the card's front edge. LED indicators and conditions are described in the following table:

Condition	Indicator	Description Of Condition
All OK; No Errors	Green LED	No errors detected.
No Lock	Red LED	Signal is not present or cannot be locked.
Biphase Coding Error	Red LED	Biphase coding of incoming date is incorrect.
Parity Error	Red LED	SRD stream's parity bit is not set as specified.
CRC Error	Red LED	The CRC value calculated for the incoming data does not match the CRC byte of the channel status word.
Confidence Flag Error	Red LED	The received data eye opening is less than a half-bit period, indicating a possible lack of signal strength or high jitter. May also indicate that insufficient EA is applied.
Validity Error	Red LED	AES stream's validity bit is high. The incoming data is not suitable for conversion to an analog audio signal.
Alarm	Red LED	Indication that the external alarm contact closure is asserted, and this card is reporting an alarm.

User Configurable Contact Closure Alarm Indicator

A red LED mounted under the Error LEDs on the front edge of the DA card provides a user-configurable **Contact Closure** alarm indicator. When this LED is on, the external alarm contact closure is asserted, indicating an error has occurred.

Jumpers **J3A-F** are used to determine which error conditions will trigger the alarm (*see* Figure 1-4 below). When all of the jumpers are in place, any of the condition errors will trigger the **Contact Closure** alarm to be asserted. If one of these jumpers is removed, then the error condition associated with the missing jumper may occur but will not trigger the **Contact Closure** alarm to be asserted and the **Alarm** LED will not light. Whenever the contact closure alarm is asserted, the **Alarm** LED will light and an alarm **Contact Closure** signal will be sent out.
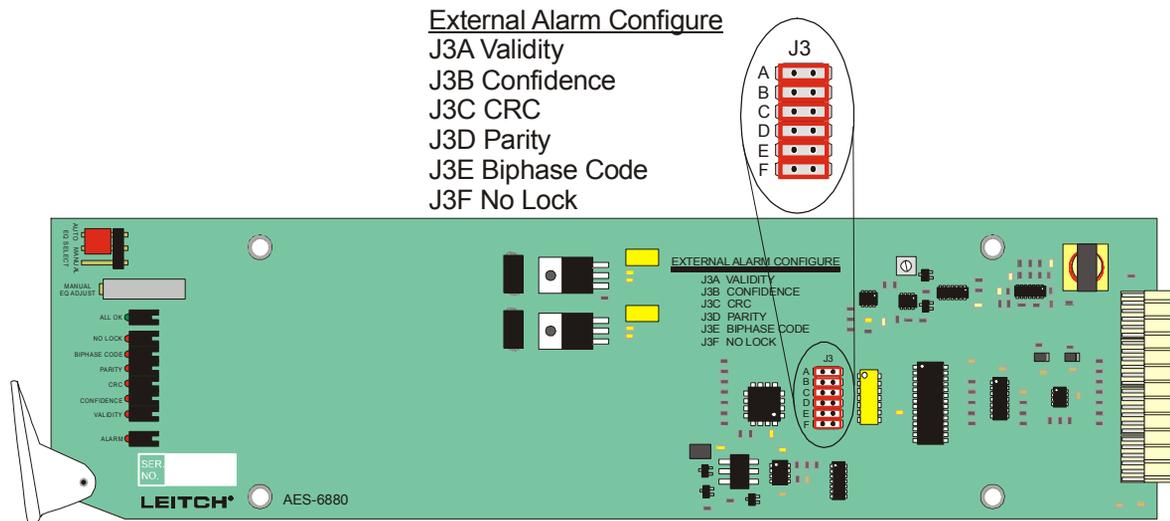
Figure 1-4. AES-6880 Jumper Selection

External Alarm

An external alarm may be connected to an FR-6800 or FR-7000 series frame housing this and other DAs. The alarm is shared by all the DA modules housed within the frame. If a card within the frame detects and triggers the **Contact Closure** alarm, the external alarm is asserted. Figure 1-5 below shows how a typical alarm configuration looks within a system.
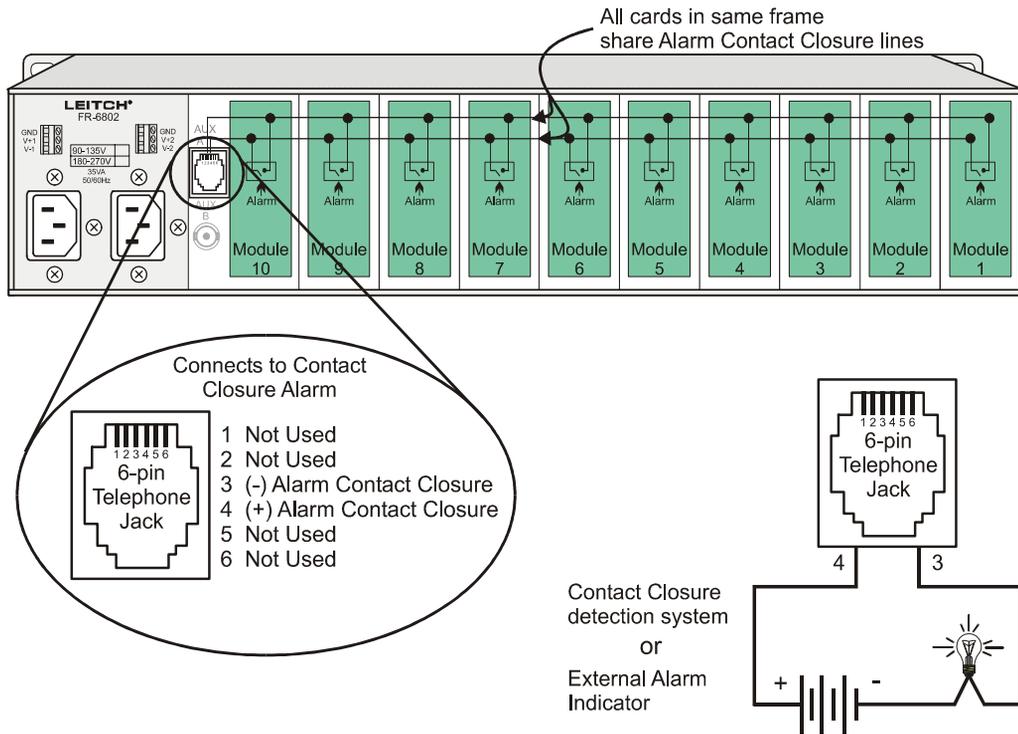
Figure 1-5. External Alarm Connections

Specifications

Inputs

Item	Specification
Number of Inputs	1
Input Coupling	Transformer Coupling
Input Impedance	75Ω
Input Return Loss	>30 dB
Normal Input Signal Level	1.0 Vp-p
Minimum Input Signal Level	0.1 Vp-p

Output

Item	Specification
Number of Outputs	8
Output Impedance	75Ω
Output Return Loss	30 dB
Level	1.0 Vp-p
DC Offset	<50 mV
EQ	2000 ft (600 m) Belden 8281 cable or equivalent
EQ Mode	Automatic or manual adjustment
Reclock	Yes
Output Jitter	<5 ns
Rise and Fall Time	Between 35 ns and 42 ns
Propagation Delay	Approximately 600 ns

Power Supply

The power supply equipped in either an FR-6800 or FR-7000 series frame is appropriate for the AES-6880. The power supply supplies ±6.5 V to the module.

DNH-6800 DigiNet Hub Module

Overview

The DNH-6800 DigiNet Hub module connects up to nine separate DigiNet cable segments into one logical control network, making it possible to span large physical distances and support a greater number of unit nodes without degradation of signal quality due to attenuation and return loss.

A data stream originating from a node on any one of the nine DigiNet segments is automatically detected, reclocked, reshaped, and retransmitted to all other segments by the DNH-6800. DigiNet's Carrier Sense Multiple Access with Collision Detect (CSMA/CD) protocol is supported by implementing independent collision detection on each channel and by a jamming mechanism that propagates a collision event detected on a transmitting channel to transmitting nodes on all other channels (*see* Figure 2-1 "DNH-6800 Block Diagram Flow" on page 12).

Specifications and designs are subject to change without notice.

Block Diagram Flow
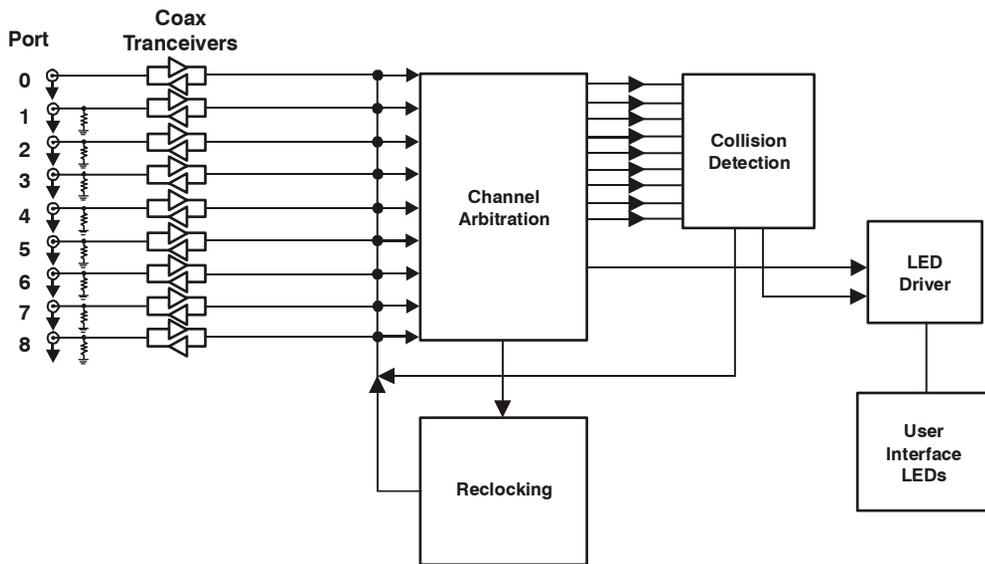
Figure 2-1. DNH-6800 Block Diagram Flow

Specifications

Total Power Dissipation

Item	Specification
Maximum (heavy traffic)	250 mA @ 6.5V (positive rail 1.50 W, negative rail 0.3 W, total 1.8 W)
Minimum (no traffic)	75 mA @ -6.5V

DigiNet Ports

Item	Specification
Number	1 (named Channel 0)
Type	75Ω BNC connector, unterminated
Location	Auxiliary input B
Number	8 (named Channel 1 through Channel 8)
Type	75Ω BNC connector (with on-board termination)
Location	Backplane connector, Outputs 1 through 8
Network Protocol	LonTalk CSMA/CD with proprietary transceiver
Signaling	1.25 Mb/s, Manchester encoded
Levels	1 V
Return Loss	Channel 0: • 28 dB or better @ 2.5 MHz • 22 dB or better @ 5.0 MHz Channels 1-8: • 45 dB or better @ 2.5 MHz • 40 dB or better @ 5.0 MHz

Maximum Unit Nodes

Item	Specification
Per Port (Channels 1- 8)	50
Maximum Cable Length	1000 ft (300 m) with new transceivers

Installation

The DNH-6800 is designed to be used in a 1RU FR-680x and FR-7001 frame, or a 2RU FR-680x frame. A 1RU frame will accommodate a maximum of Four DNH-6800s, while a 2RU will accommodate a maximum of Ten DNH-6800s.

Mounting Requirements

The DNH-6800 module requires 1.75 in. (44 mm) of standard 19 in. (483mm) rack space. The depth from the mounting surface is 17.5 in. (445 mm).

Cooling

The DNH-6800 unit is designed to operate in an ambient temperature range of 0° to +50°C. No special provisions for cooling are necessary, but care should be taken to prevent excessive heat rise in closed, unventilated equipment racks.

Connections

Channel 0 is connected to the dedicated DigiNet port (AUX B) of a given 6800 series frame. To allow several DNHs to be contained within a single frame without excessive loading of the transceivers, it is not terminated. Auxiliary B (Channel 0) can be disabled to allow several DNH modules in a single frame to be isolated from each other. An external terminator should always be installed on the frame's dedicated DigiNet connector.

The other eight channels are connected to the eight output BNCs located on the backplane (the backplane's input BNC is unused).

Network Configurations

The most suitable configuration for a network is dependent upon its size. Examples of small, medium, and large networks are shown in the following sections.

Small Network

A small network is defined as having between 1 to 50 unit nodes with no DigiNet Hub module.
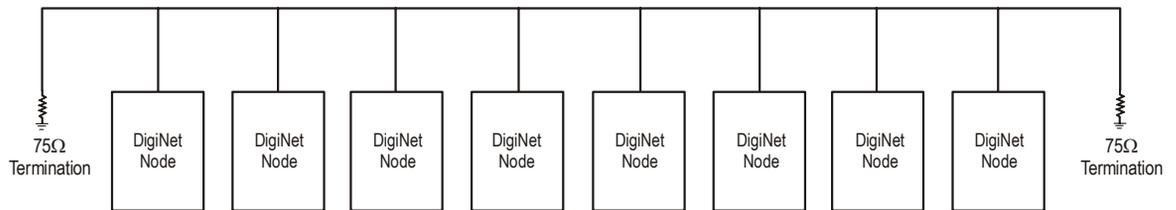
Figure 2-2. DNH-6800 Small Network

Mid-Size Network

A mid-size network is defined as having between 50 to 500 unit nodes. It includes DigiNet Hub modules.
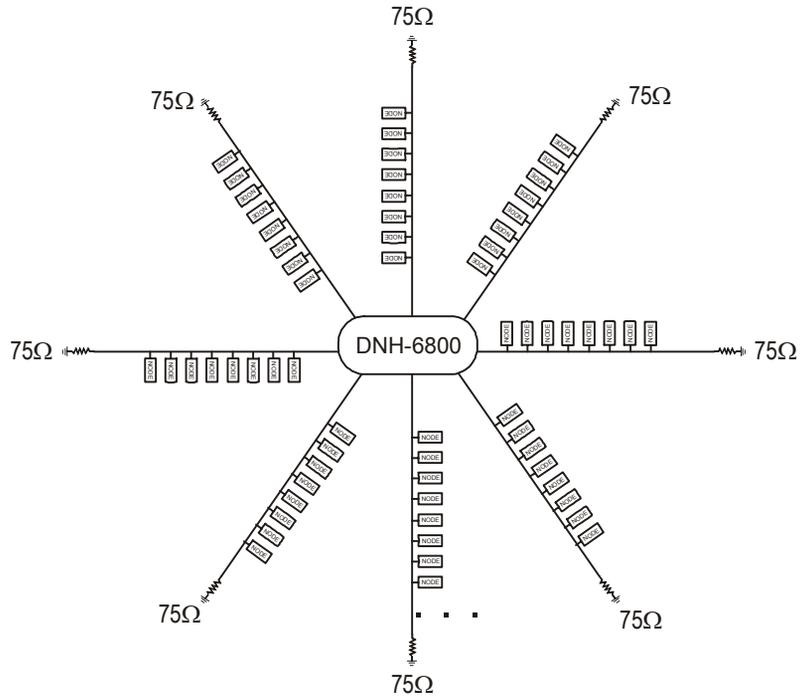
Figure 2-3. DNH-6800 Mid-Size Network

Large Network

A large network is defined as having over 500 unit nodes. Figure 2-4 illustrates a constant signal delay.
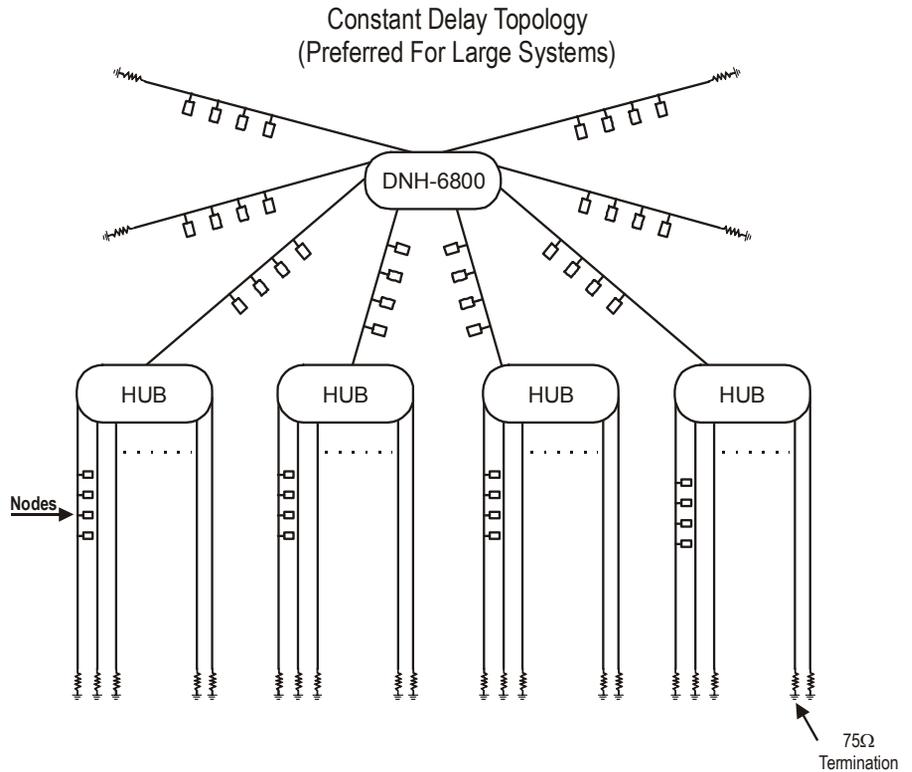
Figure 2-4. DNH-6800 DigiNet Hub Module (Large Network)

Note

This type of configuration limits delay by ensuring that the signal travels through a maximum of three Hubs.

User Interface

Indicators and Controls

The user interface consists of LEDs that indicate various states or activities, a jumper for disabling Channel 0, and a **Reset** button. These are described in the table below and shown in Figure 2-5 on page 21.

Indicators and Controls	Function
Power LED	The green power LED indicates that the DNH-6800 is powered on.
Channel LEDs	Each channel has a pair of LEDs, one green and one red. • The green LED lights when signal transmission is occurring on that channel. • The red LED briefly lights when a signal collision occurs on that channel.
Jamming LED	The jamming process occurs in conjunction with the collision detection feature and is indicated by a red LED.
Channel 0 Disable Jumper	Channel 0 is disabled with this jumper. This allows each DNH-6800 module within a single frame to act independently.
Configuration LED	In the event of a configuration failure, this LED remains continuously lit.
Reset Button	The **Reset** button is used to reset the DNH-6800 module after a configuration failure.

Note

When a signal collision occurs, the DNH-6800 briefly jams all the nodes from transmitting. The nodes then begin re-transmitting the packets at randomized intervals.
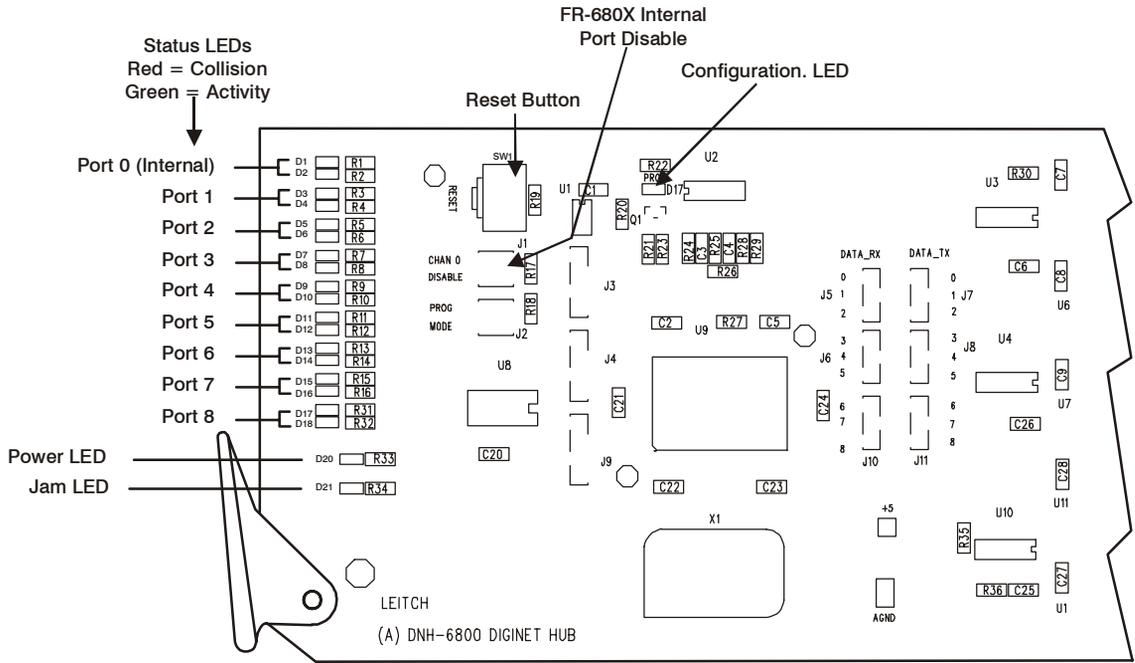
Figure 2-5. DNH-6800 Board Graphic Showing Indicators and Controls

EDH-6800-2 EDH Detection/Insertion Serial Distribution Amplifier Module

Overview

The EDH-6800-2 is a versatile serial distribution amplifier that also functions as a digital video Error Detection and Handling (EDH) check word analyzer and decoder. As a distribution amplifier, it provides equalization and reclocking to eight serial outputs. As an EDH analyzer/ inserter, it can detect errors on input signals that contain EDH information and/or insert EDH into signals where it does not already exist.

The EDH-6800-2 functions with composite (143 Mb/s), component (270 Mb/s), and the proposed 16:9 (360 Mb/s) standards.

> **Note**
>
> EDH analysis is not currently available for 360 Mb/s mode.

With EDH recognized as a method of verifying serial signals for impairments, the EDH-6800-2 offers a compact and cost-effective way of monitoring EDH in serial links without using expensive laboratory analyzers. It also provides the means to "inject" EDH check words into serial digital video signal paths. With its eight equalized and reclocked outputs, the EDH-6800-2 can also be used within a system in place of a serial distribution amplifier, with the added benefit of EDH.

Controls and indicators provide a comprehensive set of analysis functions. With them, EDH encoding on the output signal can be turned on or off and input presence and status are indicated. An on-board audible alarm can be enabled to alert the user to input signal EDH errors and an opto-isolated "contact-to-ground" signal can be used to interface to any external fault warning system.

Specifications and designs are subject to change without notice.

Specifications

Serial Video Input

Item	Specification
Standards	• SMPTE 259 M-A: 143 Mb/s, NTSC • SMPTE 259 M-C: 270 Mb/s; 525/625 component • SMPTE 259 M-D: 360 Mb/s, 525/625 is supported in simple DA mode
Connector	BNC per IEC 169-8
Impedance	75Ω >18 dB to clock frequency
Return Loss	>18 dB to clock frequency
Signal Level	800 mV ±10%
Common Mode Rej.	30 Vp-p, up to 60 Hz
Equalization	Automatic up to: >21 dB, 259 M-A typ. >23 dB, 259 M-C typ. >24 dB, 259 M-D typ.

Serial Video Outputs

Item	Specification
Number of Outputs	8
Standards	• SMPTE 259 M-A: 143 Mb/s, NTSC • SMPTE 259 M-C: 270 Mb/s, 525/625 component • SMPTE 259 M-D: 360 Mb/s; 525/625 is supported in simple DA mode
Connector	BNC per IEC 169-8
Impedance	75Ω
Return Loss	>18 dB to clock frequency
Signal Level	800 mV ± 10%

Item	Specification
DC Offset	0 V ± 0.5 V
Rise and Fall Time	400-700 ps (20 to 80% amplitude)
Overshoot	10% of amplitude (all output terminated)

Control Interface

Item	Specification
DigiNet Port Connector	75 BNCL

Power

Item	Specification
Total Power Dissipation	Positive rail: 4.3 W Negative rail: 0.1 W Total: 4.4 W

Installation

The EDH-6800-2 module can be installed in an FR-680x and FR-7001 series frame, as well as either an FR-7000MB or EDH-6800-2MB MIX BOX frame. When installed into a FR-7001 or MIX BOX frame, a corresponding back module is required.

The EDH-6800-2MB MIX BOX frame comes equipped with a dedicated control panel.

Functional Block Diagram
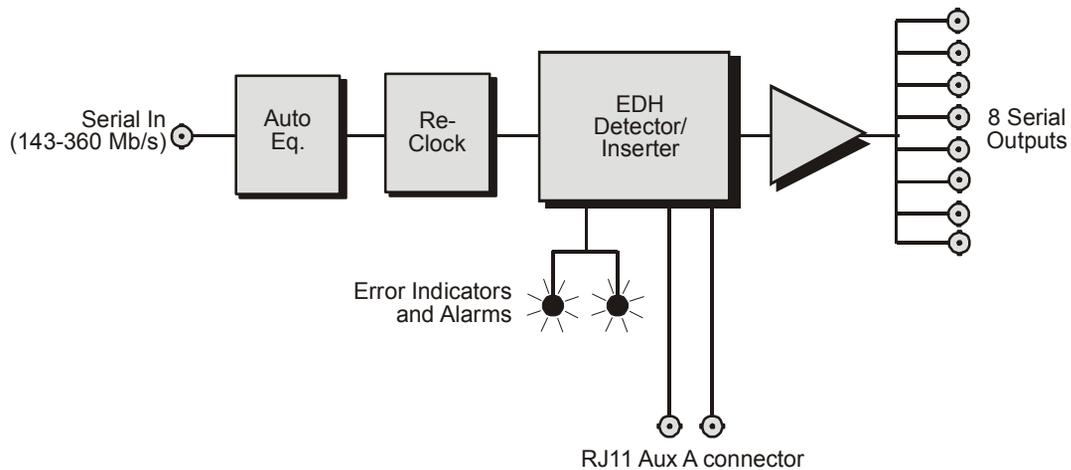
Figure 3-1. EDH-6800-2 Block Diagram

Controls, Indicators, and Jumpers

The following sections list the EDH-6800-2 switches, LEDs, and jumpers.

Switches

Switch	Description
Con/Lat (SW1)	Latching/continuous error indication switch.
	When the switch is in the **Lat** (latching) position, any detected error is captured, held, and displayed on the LED indicators until the switch is moved back to the Con (continuous) position. In the **Con** position, errors are displayed on the LED indicators only for the duration of the field with errors.
Service (SW2)	DigiNet service push button.
	When one or multiple EDH-6800-2 modules are linked together over a 75Ω network (DigiNet) and connected to the central controller (PC or Leitch DigiNet panel), the **Service** button allows you to locate the position of the particular EDH-6800-2 in the network in certain circumstances.
Alarm (SW3)	Audible alarm On/Off switch.
	This switch allows you to turn the audible alarm **On** or **Off**. In the **On** position, the sound transducer will produce a high-pitched sound when an error is detected in the incoming serial digital video (as configured by the **FF/AP** jumper).

Switch	Description
Frame ID (SW4, SW5)	Frame ID switches. If EDH-6800-2 does not detect the presence of the 9000SSN Frame ID device (if none are present at the **RJ11**, or if FR_ID jumpers are **Off**), it will attempt to use the dual HEX Frame ID switches (**SW4** and **SW5**) to determine the frame ID. **SW4** is the most significant hex digit, while **SW5** is the least significant. For example, for a Frame ID of 0x42, **SW4** should be set to **4** and **SW5** should be set to **2**. Any hex value other than 0xFF may be used as an EDH-6800-2 Frame ID. A Frame ID setting of 0 x FF indicates that Frame ID setting should not be used. In the latter case, EDH-6800-2 module network identification will be determined by the network controller (for example, EDH view application). EDH-6800-2 (and similar modules) should use the following Frame ID modes, listed in order of preference: • 9000SSN-based Frame ID • Frame ID switches-based Frame ID • Controller-configured network identification

> **Note**
>
> All EDH-6800-2 (and similar) modules should have the same setting for the Frame ID switches. This is not strictly necessary if 9000SSN Frame ID is in use, since all modules in the same frame will use the same 9000SSN Frame ID.

LEDs

LED	Description
360, 270, 143, 525, 625	Line standard and rate indication. These LEDs indicate the current operating standard of the incoming serial digital video. • 360/270/143 refer to the corresponding serial digital rates. • 525/625 refer to the corresponding line standard.
Vid_Pres	Video Present Indication. The **Video Present** LED lights when adequate 4:2:2 input digital video is applied to the rear input connector.
EDH_Pres	EDH present indication. The **EDH Presen**t LED lights when the input digital video stream contains the error status packet, as defined by RP 165-1993 SMPTE Recommended Practice.

LED	Description
Alarm	Alarm indication. This LED lights when errors are detected in the input digital video data. The type of error that triggers this LED is configured by the **FF/AP** jumper.
AP_ERR	Active Picture CRC Error Indication (*see* page 30). The **Active Picture Error** LED lights when input digital video errors are detected only in the active picture region.
FF_Err	Full field crc error indication. The **Full Field Error** LED lights when input digital video errors are detected anywhere in the field, including AP, ANC, vertical blanking interval, and horizontal blanking interval regions.
CSUM_Err	Checksum error indication. The **Checksum Error** LED lights to indicate an input EDH packet checksum error.
D18	Service-micro controller status indication (normally off). The **Service** LED blinks when the module is powered up, but remains off during normal operation. If the LED is continuously on, or blinking, there is the possibility of hardware failure. The LED remains on when the **Service** switch (**SW2**) is pressed.

Jumpers

Jumper	Description
525/625	Forces the line standard to 525, 625, or auto. This jumper allows you to set the EDH-6800-2 configuration to the known line standard of either 525 or 625. Removing the jumper puts the module in **Auto** mode. In **Auto Line Standard** mode, the EDH-6800-2 automatically detects the line standard and configures accordingly. This jumper is only active if the **Remote** jumper is set to **EN**.
FF/AP	Selects the FF or AP region. This jumper allows you to select the error (Active Picture or Full Field) which will activate the **Alarm** LED, the audible alarm, and the fault reporting opto-isolated output. This jumper is only active if the **Remote** jumper is set to **EN**.
Remote EN/ DIS	Enables the Remote. EDH-6800-2 can support three external control interfaces: • Local - module-edge LED, jumpers, and switches • Network - remote control network interface (DigiNet) • Front Panel - MIXBOX front panel interface • The **Remote** EN/DIS jumper, in concert with automatic front-panel detection, places the EDH-6800-2 into one of the following modes: <table><tr><th>Remote Jumper</th><th>Front Panel Detected</th><th>Control Mode</th></tr><tr><td>DIS</td><td>NO</td><td>LOCAL only</td></tr><tr><td>DIS</td><td>YES</td><td>FRONT PANEL only</td></tr><tr><td>EN</td><td>NO</td><td>NETWORK only</td></tr><tr><td>EN</td><td>YES</td><td>NETWORK and FRONT PANEL</td></tr></table>
EDH On/Off	Enables EDH processing or bypass mode. This jumper enables EDH processing (if **On**) or places EDH-6800-2 into bypass mode (if **Off**). In bypass mode, the EDH-6800-2 acts as a simple DA, and both input EDH analysis and output EDH generation are disabled.

📝**Note**

Both jumpers (**J5** and **J8**) must be configured identically. And all EDH-6800-2 (and similar) modules in the same frame must be configured identically (FR-ID **On** or **Off**).

Jumper	Description
FR_ID On/Off	Selects between external 9000SSN Frame ID or fault opto-isolated output.
	When set to **On**, EDH-6800-2 will attempt to read the Frame ID from the 9000SSN silicon serial number device at the FR-680X series frame **RJ11** connector. When set to **Off**, the EDH-6800-2 will use the **RJ11** connector for the fault reporting output *(see* page 32.*)* When both jumpers are removed, the EDH-6800-2 is isolated from the **RJ11** connector. If EDH-6800-2 does not detect the 9000SSN device (if none is present at the **RJ11** or if FR-ID is **Off**), EDH-6800-2 will attempt to use the dual hex Frame ID switches (**SW4** and **SW5**) to determine Frame ID.

Fault Reporting Output

The fault-reporting optically-isolated output is accessible at the rear **RJ11** connector of the FR-680X series frame. **RJ11** pins 3 and 4 are used as negative and positive terminals respectively.

The output is open when no errors are occurring, is closed with frame power removed, and pulses closed for the duration of a field with EDH errors (as configured by the **FF/AP** jumper).

Figure 3-2 illustrates a basic interface:
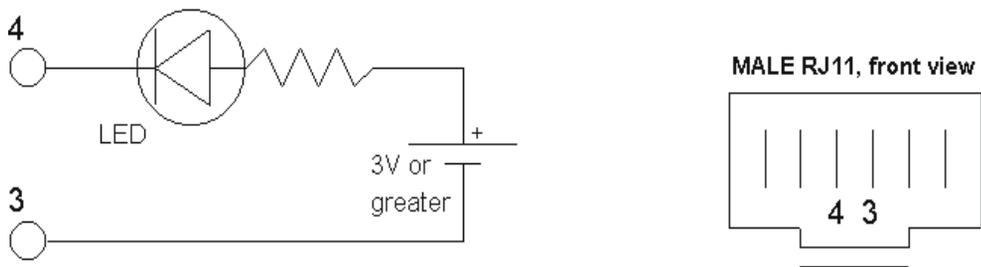
Figure 3-2. Fault Reporting Output

Chapter 4

USM-6800 PAL/NTSC Monitoring Encoder Module

Overview

The USM-6800 offers the combination of a 4 output NTSC/PAL encoder and a 4 Output serial distribution amplifier. It is capable of removing jitter from the 4:2:2 serial signal before encoding and conversion to analog. The result is a clean composite analog signal which also maintains zero SCH. Automatic switching based on the input line rate of 525 or 625 lines is provided.

The USM-6800 can also be configured to provide RGB, YUV or YC outputs. When RGB or YUV are selected, three of the output BNCs provide the component signal, while the remaining BNC still provides composite analog.

When YC is selected, two of the outputs are switched to YC, the other two remaining NTSC or PAL, depending upon the line standard in use. An optional adaptor, which plugs into the rear BNCs, provides a standard YC connector. The four serial digital outputs are always present.

Specifications and designs are subject to change without notice.

Features

Note

If the serial input is lost, the outputs will be black.

The USM-6800 has the following features:

- Vertical blanking Pass/Blank
- On/Off Set Up
- On/Off Burst
- On/Off Chroma
- On/Off control of a built-in color bar generator
- PAL/NTSC Monitoring Encoder
- Selectable outputs:
4 NTSC/PAL Composite Analog
- RGB or YUV and 1 composite analog
- YC and 2 composite analog
- 525/625 line auto switching 4 equalized, re-clocked serial outputs

Specifications

Serial Video Input

Item	Specification
Standards	SMPTE: 259 M-C; 270 Mb/s, 525/625
Connector	BNC per IEC 169-8
Impedance	75Ω
Return Loss	>18 dB to clock frequency
Signal Level	800 mV ±10%
Common Mode Rejection	30 Vp-p up to 60 Hz
Equalization	Automatic up to 22 dB, 259 M-C

Serial Video Outputs

Item	Specification
Number of Outputs	4
Standards	SMPTE: 259 M-C; 270 Mb/s, 525/625
Connector	BNC per IEC 169-8
Impedance	75Ω
Return Loss	>18 dB to clock frequency
Signal Level	800 mV ± 10%
DC Offset	0 V ± 0.5 V
Rise and Fall Time	400-700 ps (20 to 80% amplitude)
Overshoot	<10% of amplitude (all outputs terminated)

Composite Analog Outputs

Item	Specification
Number of Outputs	4
Type	NTSC or PAL (input line rate dependent)
Impedance	75Ω
Return Loss	36 dB to 5 MHz
Signal Level	1.0 Vp-p ± 10%
DC Offset	± 100 mV
Differential Gain	1.5%
Differential Phase	1.5%
Chroma-Luma Delay	± 10 ns
Power Dissipation	• Positive rail: 2.8 W • Negative rail: 2.6 W • Total: 5.4 W

Component Analog Outputs

Item	Specification
Number of CAV outputs	1 of GBR or Y, R-Y, B-Y
Impedance	75Ω
Gain Adjustable Range	700 mV, -10% to +50% on R-Y and B-Y ±10% on RGB
DC Offset	±100 mV
Chroma/Lum. Delay Error	±3 ns
Return Loss	>36 dB to 5 MHz on all outputs
Quantizing	8 bits

Functional Block Diagram
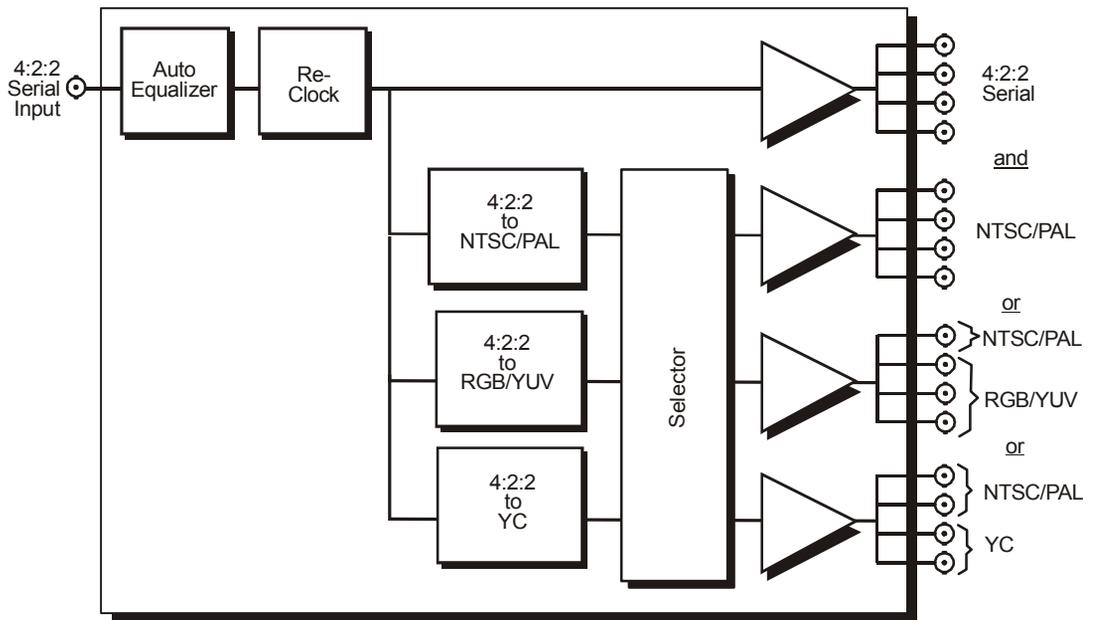
Figure 4-1. USM-6800 Functional Block Diagram

Rear Connector
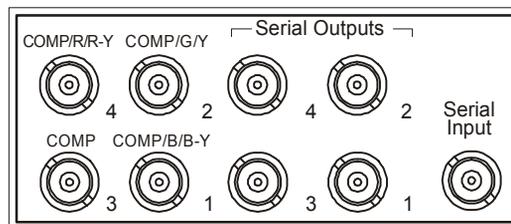
Figure 4-2. USM-6800 Rear Connector Layout

Controls and Indicators

The controls and indicators described in the tables below are located at the front edge of the module.

Switch	Function
16-position rotary switch	Selector
3-position up/down momentary switch	Adjuster
Gain and frequency multi-turn potentiometer	Adjuster

Status LEDs

LEDs	Function
625 Auto 525 LED	When this Green **Auto** LED is on, this indicates the detected standard. When the **Auto** LED is off, this indicates a forced line standard.
Error LED	This Red LED indicates: there is loss of video, the forced line standard is different than the detected standard, or there is a missing or mispositioned EAV-timing reference signal in the digital data.

Default Settings

The USM-6800 is shipped with the following default settings:

LEDs	Function
Standard	Set to **Auto**
Output	Set to **Component YUV**
V Blanking	Set to **Pass**
Setup	Set to **On**
Burst	Set to **On**
Chroma	Set to **On**

User Interface

The following chart describes the **Mode Select** switch and **Toggle** switch functions:

Mode Select Switch		Toggle Switch	
Position	**Function**	**Down**	**Up**
0	Operate	• Normal operation; **Toggle** switch disabled. • Store any changed settings to *EEPROM.	
1	Standard	**Force**: Forces the configuration of the board into 525 or 625 line standard depending on position **2** of **Mode Select** switch configuration.	**Auto**: The configuration of the board 525 or 625 line standard depends on the detected standard.
2	Force Standard	**625**: Forces the board configuration into the 625 line standard. Position 1 of the **Mode Select** switch should be configured for the **Force** mode.	**525**: Forces the board configuration into the 525 line standard. Position **1** of the **Mode Select** switch should be configured for the **Force** mode.
3	RESERVED		
4	Output	**Component**: Generates RGB or YUV analog outputs depending on position 6 of the **Mode Select** switch configuration.**	**Composite**: Generates the YC=2 composite or Y composite analog outputs depending on position **5** of the **Mode Select** switch configuration.

📝 **Note**

***This configuration decreases board power consumption from 5.4 to 5.0 W and requires that the jumpers be set to **Position** B. In all other cases, they should be in position **A**.

Mode Select Switch		Toggle Switch	
Position	**Function**	**Down**	**Up**
5	Composite	**2 comp+YC**: Generates 2 composite and YC analog outputs. Position **4** of **Mode Select** switch should be configured for the **Composite** mode.	**4 comp**: Generates 4 composite analog outputs. Position **4** of the **Mode Select** switch should be configured for the **Composite** mode.***
6	Component	**RGB**: Generates RGB analog output. Sync is present on all of the outputs. On-board potentiometer allows the adjustment of overall gain and each channel gain independently. Position **4** of the **Mode Select** switch should be configured for **Component** output.	**YUV**: Generates YUV analog outputs. Sync is present on the Y output. On-board potentiometer allows the adjustment of the overall gain and each channel gain independently. Position **4** of the **Mode Select** switch should be configured for **Component** output.
7	V Blanking	**Blank**: All of the information in the VBI is blanked: Up to line 20 in 525 line standard, up to line 23 in the 625 line standard.	**Pass**: All of the information in the VBI is passed without processing for digital to analog output.
8	Setup	**Off**: The 7.5 IRE pedestal is not inserted into the analog video in 525 line standard.	**On**: The 7.5 IRE pedestal is inserted into the analog video in the 525 line standard.
9	Burst	**Off**: The burst is turned off in the 525 or 625 line standards.	**On**: The burst is turned on in the 525 or 625 line standards.
A	Chroma	**Off**: The chrominance is turned off in the 525 or 625 line standards.	**On**: The chrominance is turned on in the 525 or 625 line standards.

Converting from Component YUV to Four Composite Outputs

To convert from component YUV to four composite outputs, perform the following procedure:

1. Move jumpers **J5**, **J6** and **J7** to position **B**.

2. Move the **Mode Select** switch to position 4 and toggle **SW2 Up**.

3. Move the **Mode Select** switch to position 5 and toggle **SW2 Up**.

4. Return the **Mode Select** switch to position 0.

5. Adjust the level at **Output** 7 to 1 **Vp-p** using the **Gain** multi-turn potentiometer found near the handle of the USM-6800.

6. Adjust the level at **Output** 8 to 1 **Vp-p** using the **R-Gain** single-turn potentiometer near J7.

7. Adjust the level at **Output** 6 to 1 **Vp-p** using the **G-Gain** single-turn potentiometer near J6.

8. Adjust the level at **Output** t 5 to 1 **Vp-p** using the **B-Gain** single-turn potentiometer near **J5**.

Note

Output 7 **Video** level MUST be set before adjusting the levels at outputs 5, 6 and 8.

Chapter 5

VDA-6830 Video Distribution Amplifier Module

Overview

The VDA-6830 is a high-performance, high reliability, general-purpose analog video distribution amplifier. This module features a differential input, eight outputs, gain adjustment with a range of -3 dB to +3 dB, and high-frequency response adjustment on the front edge of the module.

Composite and component analog NTSC, PAL, SECAM signals (with sync or without sync), as well as subcarrier and coaxial version AES digital audio signals, can be amplified with the VDA-6830 in FR-680X and FR-7001 series frames.

Specifications and designs are subject to change without notice.

Specifications

Input

Item	Specification
Video Input Level	1 Vp-p nominal
Subcarrier Input Level	1 to 2 Vp-p
Input Impedance	75Ω or high impedance (selectable by a jumper)
Input Return Loss	40 dB to 10 MHz, 30 dB to 30 MHz
Coupling	DC
Common Mode Rejection Ratio	60 dB to 10 KHz
Max. Common Mode Signal Range	6 Vp-p

Output

Item	Specification
Number of Outputs	8
Output Impedance	75Ω
Output Return Loss	37 dB to 10 MHz
Output Isolation	30 dB to 10 MHz
Response Variation	0.1 dB, 1 to 8 loads to 10 MHz

Performance

Item	Specification
Gain Range	-3 dB to + 3 dB
Gain Stability	0.02 dB per 10° C
Frequency Response	< ± 0.05 dB to 10 MHz 0 to -0.5 dB to 20 MHz -3 dB bandwidth, 35 MHz typ.
Line Rate Window Tilt	0.25%
Field Rate Window Tilt	0.25%
50/60 Hz Square Wave Tilt	0.5%
Differential Gain	0.15% (10-90% APL)
Differential Phase	0.10 (10-90% APL)
S/N Ratio	65 dB to 20 MHz unweighted (0.714 V/RMS noise)
Hum	1 mVp-p
Stability with 10% Line Voltage Change	0.05%

Temperature

Item	Specification
Performance	5° to 40°C
Operating	0° to 50°C
Power Dissipation	2 W

Installation

The VDA-6830 module can be installed in a Leitch FR-680x or FR-7001 series frame, or an FR-7000MB MIX BOX frame. If this module is installed in an FR-7001 series or FR-7000 MB MIX BOX frame, a 6800-M back module is required.

There is no need to terminate unused outputs; however, doing so will improve response.

A jumper near the board connector provides a selection of input impedance between 75Ω and high impedance. This jumper should be removed if high-input impedance is required.

Operational Adjustments

> **Note**
>
> The potentiometer is factory set, and re-adjustment is not recommended without precise test equipment.

A multi-turn **Gain** potentiometer provides adjustment over a range of -3 to +3 dB. A single-turn potentiometer allows fine adjustment of the high-frequency **Response** (10-30 MHz).The gain is increased when the potentiometer is adjusted clockwise.

Both the **Gain** and **Response** controls are located on the front edge of the module.

VEA-6830 Video Distribution Amplifier Module

Overview

The VEA-6830 is a reliable, high-performance video equalizing distribution amplifier. This module provides continuous variable equalization for up to 1000 ft (300 m) of Belden 8281 coaxial cable. It can also be customized to accommodate other cable types.

The VEA-6830 features differential input, eight outputs, gain adjustment with a range of -3 dB to +3 dB, and high-frequency response adjustment on the front edge of the board.

Composite and component analog NTSC, PAL, SECAM signals, with or without sync, and subcarrier signals can be amplified with a VEA-6830 installed in an FR-680x series video distribution amplifier frame.

Specifications and designs are subject to change without notice.

The VEA-6830 can compensate for various cable types using different equalization network sub modules installed in the main module.
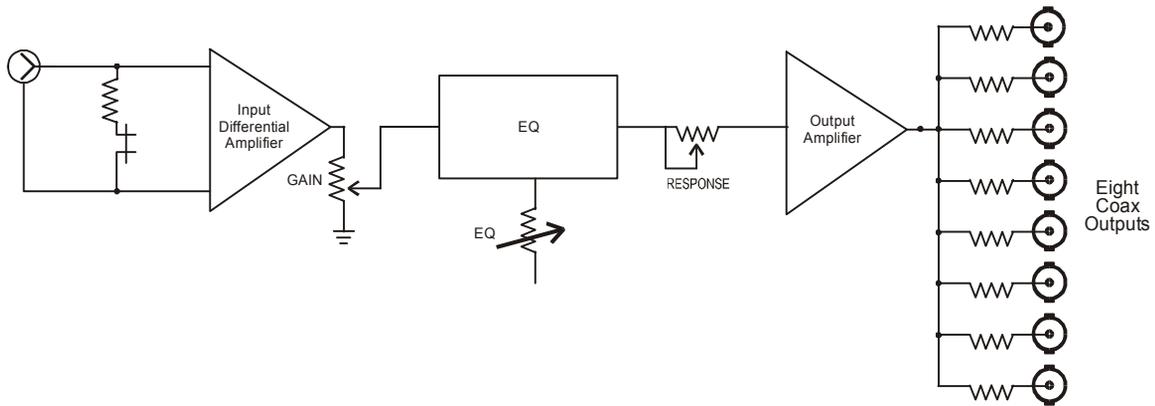
Figure 6-1. VEA-6830 Functional Block Diagram

The following modules are available:

Leitch Product	Equalization Cable Types
VEA-6830	Equalizing video distribution amplifier for 1000 ft (300 m) Belden 8281 cable
VEA-6830-1	Equalizing video distribution amplifier for 650 ft (200 m) Belden 8241 cable
VEA-6830-2	Equalizing video distribution amplifier for 800 ft (250 m) Belden 1505A cable
VEA-6830-3	Equalizing video distribution amplifier for 1000 ft (300 m) Belden 1694A cable
VEA-6830-4	Equalizing video distribution amplifier for 650 ft (200 m) PSF 1/3 cable
VEA-6830-5	Equalizing video distribution amplifier for 800 ft (250 m) Nokia 0.6/2.8 cable
VEA-6830-6	Equalizing video distribution amplifier for 800 ft (250 m) VPM2000 cable

Specifications

Input

Item	Specification
Video Level	1 Vp-p nominal
Impedance	Between 75Ω unterminated (jumper-selectable)
Coupling	DC
Return Loss	• 50 dB to 5 MHz • 46 dB to 10 MHz
Max. Common Mode Signal Range	6 Vp-p
Common Mode Rejection Ratio	55 dB to 10 kH

Output

Item	Specification
Number of Outputs	8
Impedance	75Ω
Return Loss	• 40 dB to 5 MHz • 35 dB to 10 MHz
Phase Match Between Outputs	0.25 at 3.58 MHz
Output Isolation	40 dB at 3.58 MHz
Response Variation	0.1 dB, 1 to 8 loads to 10 MHz

Performance

Item	Specification
Gain Range	-3 dB to + 3 dB
Gain Stability	0.02 dB per 10 C
Frequency Response	• 0.02 dB to 5 MHz • 0.1 dB to 10 MHz • 0.1 dB to 10 MHz • +0 / -0.2 dB at 15 MHz • -0.5 dB at 20 MHz typ. • -3 dB at 30 MHz

Differential Gain

Item	Specification
Differential Gain (10-90% APL)	0.10%
Differential Phase (10-90% APL)	0.15
Line Rate Window Tilt	0.25%
Field Rate Window Tilt	0.25%
S/N Ratio (RMS noise/0.714V)	60 dB to 20 MHz unweighted
Hum	1 mVp-p
Equalization Range	0 to 1000 ft (300 m) Belden 8281, or equivalent
Response	• 0.05 dB to 5 MHz • 0.15 dB to 10 MHz

Temperature

Item	Specification
Performance	41° to 104°F (5° to 40° C)
Operating	32° to 122°F (0° to 50° C)
Power Dissipation	2 W

Installation

The VEA-6830 Video Equalizing Amplifier and VEA-6830-70 Video Equalizing Amplifier for FR-7000 series frames (includes 6800-M rear connector) can be installed into any of the following Leitch mounting frames:

Leitch Mounting Frames	
FR-6801	1RU video DA mounting frame, with four-module capacity
FR-6804	2RU video DA mounting frame, with 10-module capacity
FR-7001	1RU video DA modules mounting frame, with four-module capacity
FR-7000MB	MIX BOX stand alone multi-purpose chassis
FR-1302	1RU video DA mounting frame, with four-module capacity
FR-2602	2RU video DA mounting frame, with 10-module capacity

Operation

A multi-turn **Gain** potentiometer provides adjustment over a range of -3 to +3 dB. The gain is increased when this pot is adjusted clockwise. Another multi-turn **Equalizing** potentiometer is used to adjust cable equalization. It is adjusted clockwise to obtain more equalization.

A single-turn **Response** potentiometer allows fine adjustment of the high-frequency response. However, it is factory-set/calibrated, and readjustment *is not* recommended without precise test equipment. These three potentiometers are located at the front edge of the module.

There is no need to terminate unused outputs; however, a perfect response can be obtained if unused outputs are terminated.

Jumper **J1** sets internal 75Ω termination. If removed, it makes the input high-impedance.
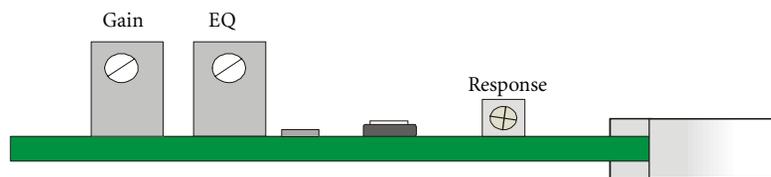
Figure 6-2. Front Edge View
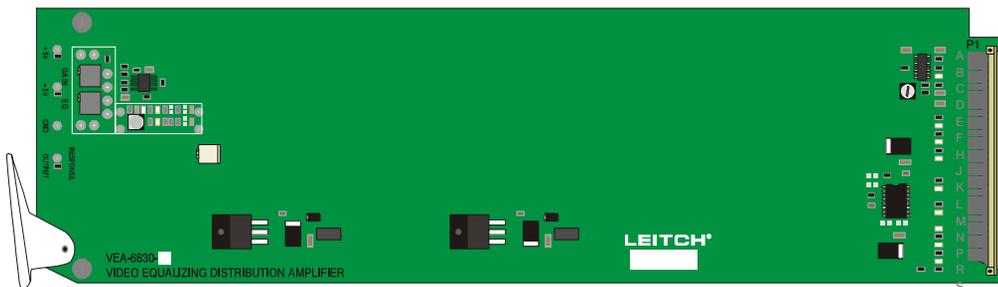
Figure 6-3. VEA-6830 Module Top View

VEA-6840 Video Equalizing Amplifier Module

Overview

The VEA-6840 is a reliable, high-performance and full-featured equalizing video distribution amplifier. This DA provides a jumper-selectable input coupling mode (DC or AC coupling), and is capable of hard and soft clamping to the composite NTSC and PAL video signal.

The VEA-6840 is equipped with continuously variable equalization for coaxial cable, features a differential input and eight outputs, and includes both gain adjustment (with a range of –3.0 dB to +3.0 dB) and high-frequency response adjustment on the front edge of the board.

An optional Removable Gain and Equalization (EQ) setting submodule can be used with the VEA-6840. This submodule can be quickly and easily moved from one DA to another without gain and equalization readjustment.

Specifications and designs are subject to change without notice.

The VEA-6840 also can compensate various types of cables using different equalization network sub modules installed in the main module.
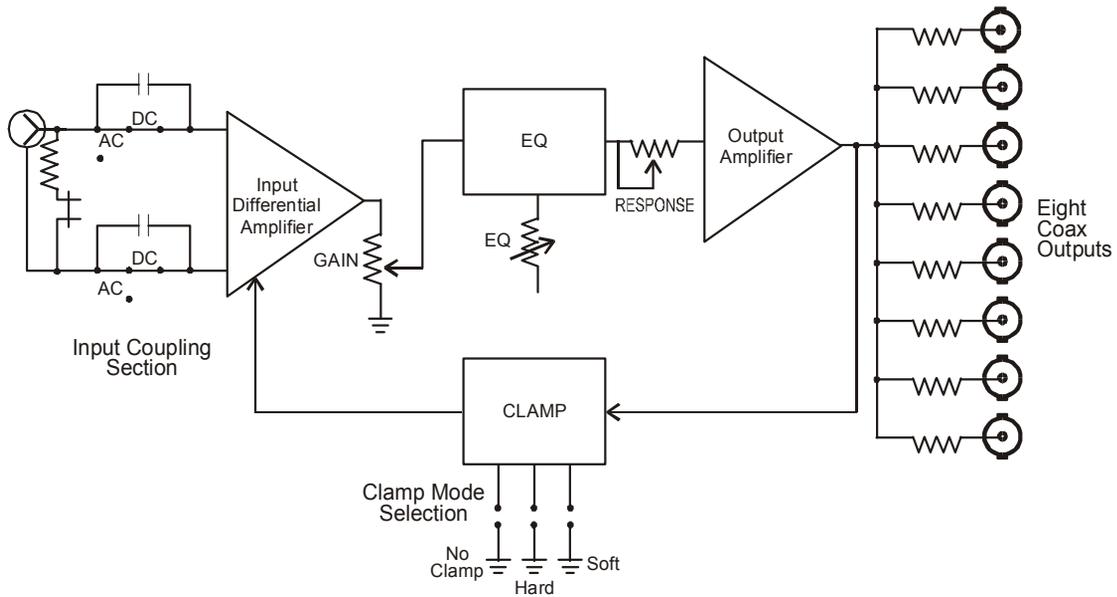
Figure 7-1. VEA-6840 Functional Block Diagram

Modules

The VEA-6840 video equalizing amplifier works in an FR-6800 series frame. The following chart describes the available module types:

Leitch Product	Equalization Cable Types
VEA-6840	Equalizing video distribution amplifier for 1000 ft (300 m) Belden 8281 cable
VEA-6840-1	Equalizing video distribution amplifier for 650 ft (200 m) Belden 8241 cable
VEA-6840-2	Equalizing video distribution amplifier for 800 ft (250 m) Belden 1505A cable
VEA-6840-3	Equalizing video distribution amplifier for 1000 ft (300 m) Belden 1694A cable
VEA-6840-4	Equalizing video distribution amplifier for 650 ft 200 m) PSF 1/3 cable
VEA-6840-5	Equalizing video distribution amplifier for 800 ft (250 m) Nokia 0.6/2.8 cable
VEA-6840-6	Equalizing video distribution amplifier for 800 ft (250 m) VPM2000 cable
VEA-6840-RMV	Equalizing video distribution amplifier for 1000 ft (300 m) Belden 8281 cable with Removable Gain/EQ setting submodule
VEA-6840-RMV-1	Equalizing video distribution amplifier for 650 ft (200 m) Belden 8241 cable with Removable Gain/EQ setting submodule
VEA-6840-RMV-2	Equalizing video distribution amplifier for 800 ft (250 m) Belden 1505A cable with Removable Gain/EQ setting submodule
VEA-6840-RMV-3	Equalizing video distribution amplifier for 1000 ft (300 m) Belden 1694A cable with Removable Gain/EQ setting submodule
VEA-6840-RMV-4	Equalizing video distribution amplifier for 650 ft (200 m) PSF 1/3 cable with Removable Gain/EQ setting submodule

Leitch Product	Equalization Cable Types
VEA-6840-RMV-5	Equalizing video distribution amplifier for 800 ft (250 m) Nokia 0.6/2.8 cable with Removable Gain/EQ setting submodule
VEA-6840-RMV-6	Equalizing video distribution amplifier for 800 ft (250 m) VPM2000 cable with Removable Gain/EQ setting submodule

Specifications

Input

Item	Specification
Video Input Level	1 Vp-p nominal
Maximum Input Level	2.5 Vp-p centered at 0 V
Impedance	75Ω or high impedance selectable
Coupling	DC and AC jumper selectable
Return Loss	>40 dB to 20 MHz
Max. Common Mode Signal Range	28 Vp-p
Common Mode Rejection Ratio	>65 dB to 10 kHz

Output

Item	Specification
Number of Outputs	8
Level	1 Vp-p nominal
Impedance	75Ω
Return Loss	• 45 dB to 5 MHz • 40 dB to 10 MHz
Output Isolation	35 dB to 10 MHz
Phase Match Between Outputs	± 0.2°
Response Variation	0.1 dB, 1 to 8 loads at 10 MHz

Performance

Item	Specification
Gain Range	± 3.0 dB
Frequency Response	• ± 0.05 dB to10 MHz • ± 0.2 dB to 20 MHz • −3dB at 40 MHz typ.
Differential Gain (10-90% APL)	<0.15%
Differential Phase (10-90% APL)	<0.15°
Line Rate Window Tilt	<0.20%
Field Rate Window Tilt	<0.20%
S/N	>70 dB measured by VM700A
Hum	<1 mVp-p
Propagation Delay	15 ± 1.0 ns

Equalization

Item	Specification
Range	• 0-1000 ft (0 to 300 m) Belden 8281 cable • 0-650 ft (0 to 200 m) Belden 8241 cable • 0-800 ft (0 to 250 m) Belden 1505A cable • 0-1000 ft (0 to 300 m) Belden 1694A cable • 0-650 ft (0 to 200 m) PSF 1/3 cable • 0-800 ft (0 to 250 m) Nokia 0.6/2.8 cable • 0-800 ft (0 to 250 m) VPM2000 cable
Response	< ±0.05 to 5 MHz < ±0.15 dB to 10 MHz

Clamp

Item	Specification
Clamping Accuracy	± 25 mV
APL Effect	± 5 mV 10-90 APL
Time Constant	3 lines and 7 lines selectable by jumper

Temperature

Item	Specification
Performance	41° – 104°F (5° to 40°C)
Operating	32° – 122°F (0° to 50°C)

Power Requirements

Item	Specification
Power Dissipation	2 W

Installation

The VEA-6840 module can be installed in any of the Leitch FR-6800 series video equalizing amplifier frames.

Termination of unused outputs are not required; however, a perfect response can be obtained if unused outputs are terminated.

Removing and Installing the RMV Submodule

The VEA-6840-RMV has a Removable Gain/EQ submodule installed that contains the **R5 Gain Adjustment** potentiometer and the **R6 EQ Adjustment** potentiometer. This submodule provides a quick card-to-card transfer of preset **Gain** and **EQ** in the event of DA card failure or swap-out.

The RMV submodule is removed by gently pulling straight up on the submodule card, and then "unplugging" it from the DA card. The RMV can be installed onto the new card by plugging it into the same position on the card as before. There is no need to readjust the **EQ** or **Gain** because the RMV submodule retains the adjustment from card to card.

Configuration
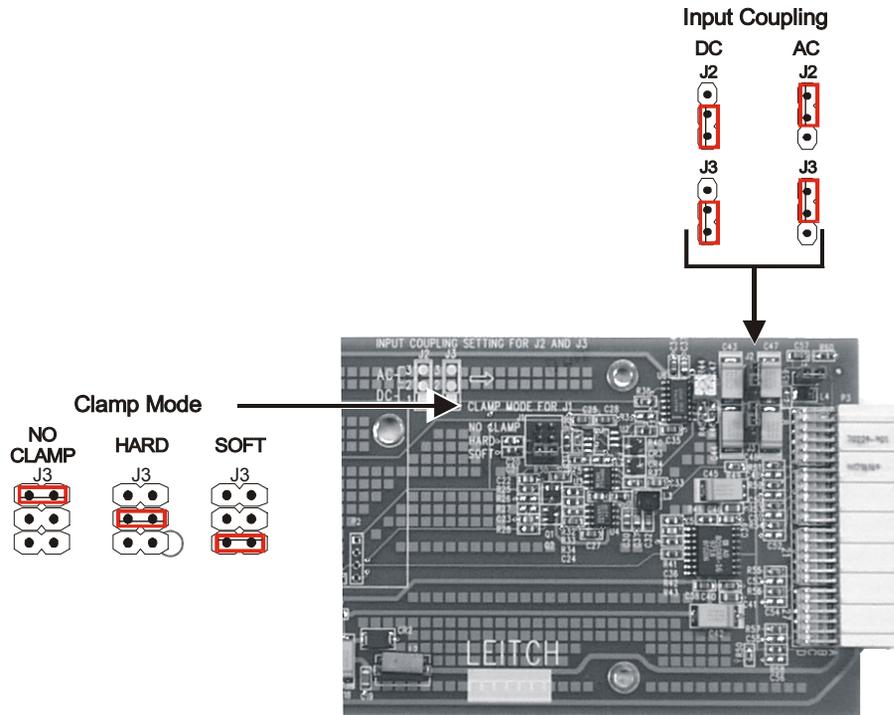
Figure 7-2. Coupling and Clamp Configuration Options

Input Coupling

> ### Note
>
> Shunt positions for **Clamp Mode a**nd **Input Coupling** are illustrated by the symbols printed on the circuit board.

- For AC coupling: Place **J2** and **J3** in the upper position, as illustrated above.

- For DC coupling: Place **J2** and **J3** in the lower position, as illustrated above.

Clamp Mode

Clamping can be set to **No Clamp**, **Hard**, or **Soft** clamp via Jumper **J1**, as illustrated above.

Operation
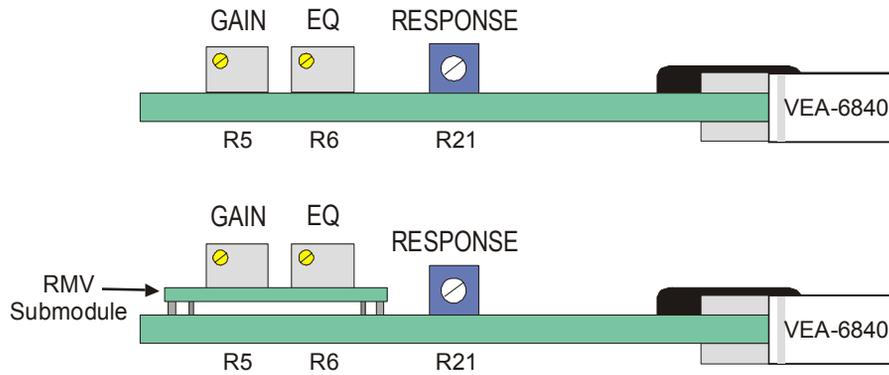
Figure 7-3. VEA-6840 and VEA-6840-RMV Card-Edge Views

A multi-turn potentiometer **Gain** (**R5**) allows for adjustment to the gain over a range of ±3 dB. The gain is increased when this potentiometer is adjusted clockwise. Another multi-turn potentiometer **EQ** (**R6**) allows for adjustment to the equalization. It is adjusted clockwise to obtain more equalization.

A single-turn potentiometer **Response** (**R21**) allows for fine adjustment to the high-frequency response. It is factory-set/calibrated, and readjustment is *not* recommended without precise test equipment.

These three potentiometers are located at the front edge of the module.

VPD-6830 Programmable Video DA Series

Overview

The VPD-6830 Programmable Video DAs are a series of reliable, high-performance, specialized function DAs for some common DA applications.

The VPD-6830 series of DAs provide a differential input, eight outputs, a jumper-selectable input coupling mode for DC and AC coupling, soft and hard clamping capability for composite NTSC and PAL video signals, and a continuously variable equalization for various types of coaxial cables.

The VPD-6830 series also features gain adjustment over a range of -3 dB to +3 dB, and high-frequency response adjustment on the front-card edge of the board.

Four video submodules are available for installation into the base DA module (VEA-6840). Only one submodule can be installed at a time.

Specifications and designs are subject to change without notice.

VPD-6830 Series DAs

Models available in the VPD-6830 series are listed in the following table:

Model Number	Description
VPD-6830-CLP	Video Equalizing DA with Hard and Soft White Video Clip
VPD-6830-XEQ	Video Equalizing DA with extra EQ for Belden 8281 cable lengths from 0 to 3250 ft (1000 m)
VPD-6830-DEQ	Video Equalizing DA with dual EQ for 1000 ft (300 m) Belden 8281 (or equivalent) and 800 ft (250 m) Nokia 0.6/2.8
VPD-6830-DLY240	Video Equalizing DA with Delay 0 to 240 ns
VPD-6830-DLY435	Video Equalizing DA with Delay 200 to 435 ns
VPD-6830-DLY635	Video Equalizing DA with Delay 400 to 635 ns
VPD-6830-DLY835	Video Equalizing DA with Delay 600 to 835 ns
VPD-6830-DLY1035	Video Equalizing DA with Delay 800 to 1035 ns
VPD-6830-DLY1235	Video Equalizing DA with Delay 1000 to 1235 ns

Cables

The following table describes the cable type used:

Model Number	Cable Type
VPD-6830-*xxx* (CLP, etc.)-1	EQ for 650 ft (200 m) Belden 8241 cable
VPD-6830-*xxx*-2	EQ for 800 ft (250 m) Belden 1505A cable
VPD-6830-*xxx*-3	EQ for 1000 ft (300 m) Belden 1694A cable
VPD-6830-*xxx*-4	EQ for 650 ft (200 m) PSF 1/3 cable
VPD-6830-*xxx*-5	EQ for 800 ft (250 m) 0.6/2.8 cable
VPD-6830-*xxx*-6	EQ for 800 ft (250 m) VPM2000 cable

Installation

The VPD-6830 series DAs may be installed into any Leitch FR-6800 series video distribution amplifier.

Termination of unused outputs is not required; however, a perfect response can be obtained if unused outputs are terminated.

VPD-6830-CLP

The VPD-6830-CLP functions as an adjustable luminance and hard white clip. Figure 8-1 "VPD-6830-CLP Functional Block Diagram" outlines its functionality.
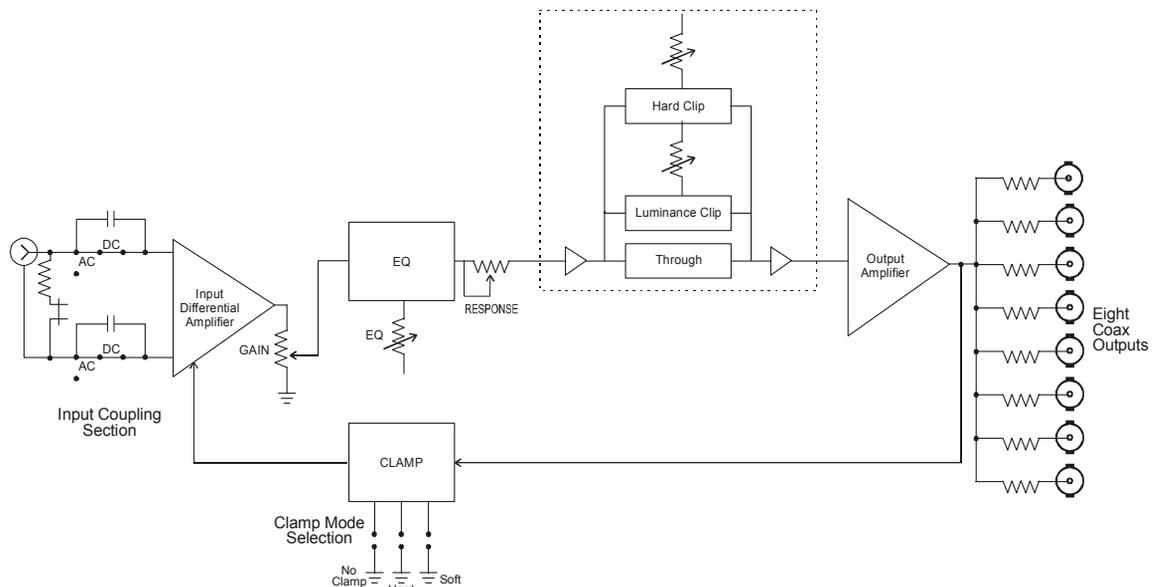
Figure 8-1. VPD-6830-CLP Functional Block Diagram
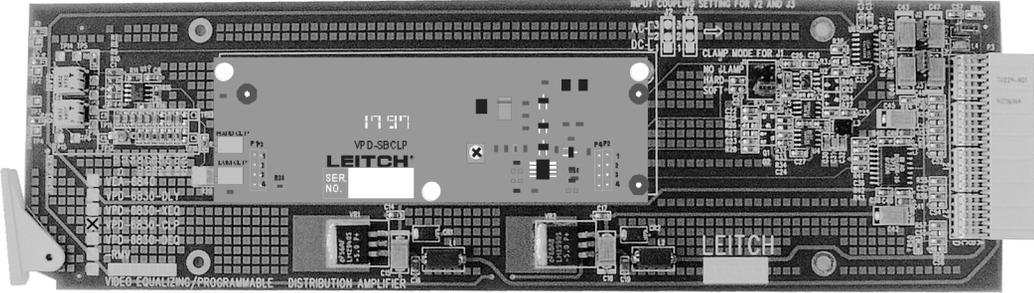
Figure 8-2. VPD-6830-CLP Video Equalizing DA with Hard and Soft White Clip.

VPD-6830-CLP Specifications

Input

Item	Specification
Video Input Level	1 Vp-p nominal
Maximum Video Input Level	2.5 Vp-p centered at 0 V
Impedance	75Ω or high-impedance-selectable
Coupling	DC and AC jumper-selectable
Return Loss	> 40 dB to 20 MHz
Max. Common Mode Signal Range	28 Vp-p
Common Mode Rejection Ratio	> 65 dB to 10 kHz

Output

Item	Specification
Number of Outputs	8
Level	1 Vp-p nominal
Impedance	75Ω
Return Loss	> 45 dB to 5 MHz > 40 dB to 10 MHz
Output Isolation	> 35 dB to 10 MHz

Performance

Item	Specification
Gain Range	-3 dB to + 3 dB
Line Rate Window Tilt	< 0.25%
Field Rate Window Tilt	< 0.25%

Item	Specification
S/N	> 70 dB measured by VM700A
Hum	< 1 mV p-p
Main EQ Range	• 0 to 1000 ft (300 m) Belden 8281 cable • 0 to 650 ft (200 m) Belden 8241 cable • 0 to 800 ft (250 m) Belden 1505A cable • 0 to 1000 ft (300 m) Belden 1694A cable • 0 to 650 ft (200 m) PSF 1/3 cable • 0 to 800 ft (250 m) NOKIA 0.6/2.8 cable • 0 to 800 ft (250 m) VPM2000 cable
Hard Clip Knee	125 IRE
Soft Clip Knee	110 IRE
Response	< ±0.1 dB DC-8 MHz
Differential Gain	< 0.25%
Differential Phase	< 0.25°
Propagation Delay	24 ± 1.0 ns

Clamp

Item	Specification
Clamping Accuracy	$< \pm 25$ mV
APL Effect	$< \pm 5$ mV 10 to 90 APL
Time Constant	3 lines and 7 lines selectable

Temperature

Item	Specification
Performance	41° to 104°F (5° to 40°C)
Operating	32° to 122°F (0° to 50°C)

Power Requirements

Item	Specification
Power Dissipation	< 2 W

VPD-6830-CLP

Configuration

1. Set the input coupling for either AC or DC coupling using jumpers **J2** and **J3**. *See* Figure 8-3 on page 71 for jumper locations.

2. Set the **Clamping** mode on jumper **J1** to either **Soft**, **Hard** or **No Clamp**. *See* Figure 8-3 on page 71 for jumper location.

3. Adjust the gain over a range of -3 dB to +3 dB using the **R5** multi-turn potentiometer in the base module.

   Turn the potentiometer Clockwise to Increase the gain. *See* Figure 8-4 on page 71.

4. Adjust the equalization using the **R6** multi-turn potentiometer in the base module.

   Turn the potentiometer clockwise to obtain more equalization. *See* Figure 8-4 on page 71.

5. Make fine adjustments to the high-frequency response using the **R21** Single-Turn potentiometer in the base module.

   The high-frequency response is factory-set/calibrated. Readjustment is not recommended without precise test equipment. *See* Figure 8-4 on page 71.

6. Adjust the **Hard** clip level using the **R4** multi-turn potentiometer located on the VPD-6830-CLP submodule. *See* Figure 8-3 "VPD-6830-CLP Configuration" on page 71.

7. Adjust the **Luminance** clip using the **R13** multi-turn potentiometer located on the card edge of the submodule card. *See* Figure 8-4 "VPD-6830-CLP Card-Edge View" on page 71.
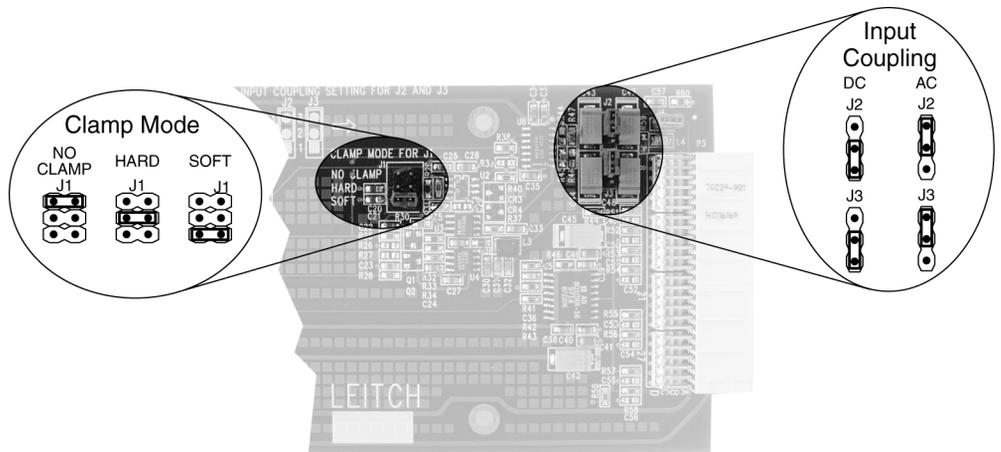
Figure 8-3. VPD-6830-CLP Configuration
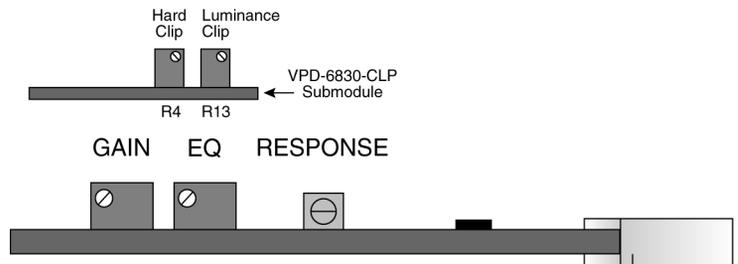
Figure 8-4. VPD-6830-CLP Card-Edge View

VPD-6830-XEQ

The VPD-6830-XEQ is used to compensate extremely long running cable, up to 3250 ft (1000 m) of Belden 8281. The following diagram describes its functionality:
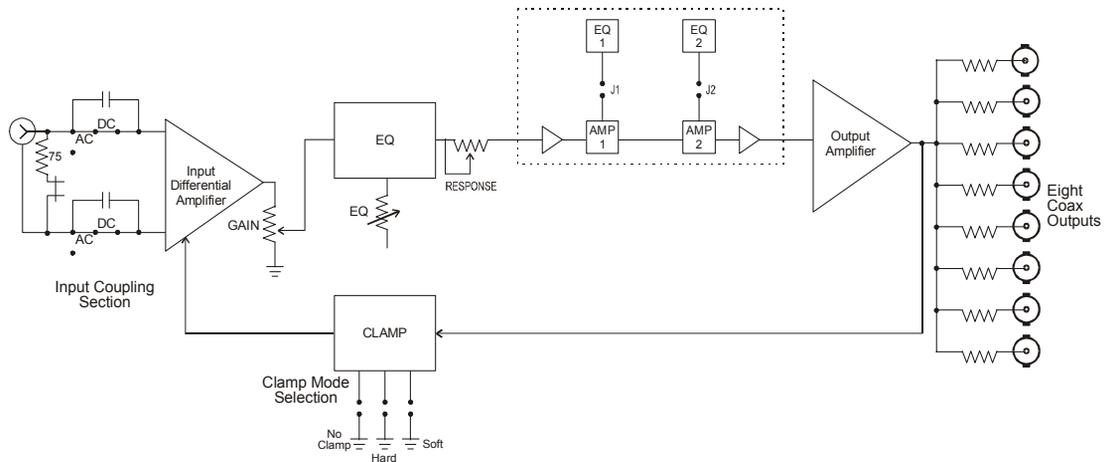
Figure 8-5. VPD-6830-XEQ Functional Block Diagram
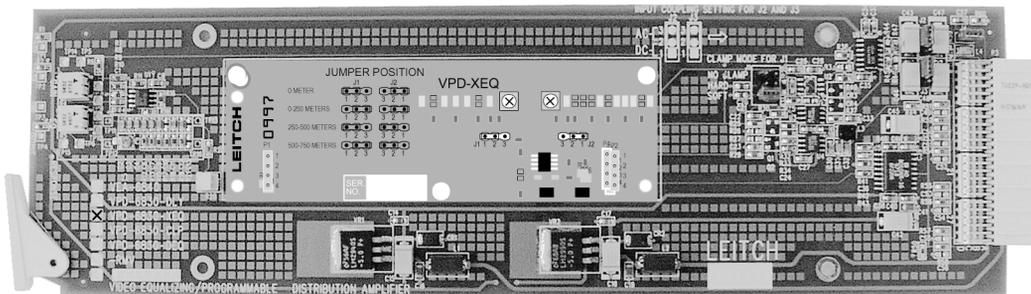
Figure 8-6. VPD-6830-XEQ

VPD-6830-XEQ Specifications

Input

Item	Specification
Video Input Level	1 Vp-p nominal
Maximum Video Input Level	2.5 Vp-p centered at 0 V
Impedance	75Ω or high impedance-selectable
Coupling	DC and AC jumper-selectable
Return Loss	> 40 dB to 20 MHz
Max. Common Mode Signal Range	28 Vp-p
Common Mode Rejection Ratio	> 65 dB to 10 kHz

Output

Item	Specification
Number of Outputs	8
Level	1 Vp-p nominal
Impedance	75Ω
Return Loss	• > 45 dB to 5 MHz • > 40 dB to 10 MHz
Output Isolation	> 35 dB to 10 MHz

Performance

Item	Specification
Gain Range	-3 dB to + 3 dB
Line Rate Window Tilt	< 0.25%
Field Rate Window Tilt	< 0.25%

Item	Specification
S/N	> 70 dB measured by VM700A
Hum	< 1 mV p-p
EQ Range	0 to 3250 ft (1000 m) Belden 8281
Response	< ±0.1 dB DC to 6 MHz < ±0.2 dB to 10 MHz
Differential Gain	< 0.2%
Differential Phase	< 0.2°
Propagation Delay	30 ±1.0 ns

Clamp

Item	Specification
Clamping Accuracy	<± 25 mV
APL Effect	<± 5 mV 10-90 APL
Time Constant	3 lines and 7 lines selectable

Temperature

Item	Specification
Performance	41° – 104°F (5° to 40°C)
Operating	32° – 122°F (0° to 50°C)

Power Requirements

Item	Specification
Power Dissipation	< 2 W

VPD-6830-XEQ

Configuration

1. Set the **Input Coupling** for either AC or DC coupling using jumpers **J2** and **J3**. *See* Figure 8-7 on page 76 for jumper locations.

2. Set the **Clamping** mode on jumper **J1** to either **Soft**, **Hard** or **No Clamp**. *See* Figure 8-7 on page 76 for jumper location.

3. Adjust the gain over a range of -3 dB to +3 dB using the **R5** multi-turn potentiometer in the base module.

   Turn the potentiometer clockwise to increase the gain. *See* Figure 8-8 on page 76.

4. Adjust the equalization using the **R6** multi-turn potentiometer in the base module.

   Turn the potentiometer clockwise to obtain more equalization. *See* Figure 8-8 on page 76.

5. Make fine adjustments to the high-frequency response using the **R21** single-turn potentiometer in the base module.

   The high-frequency response is factory-set/calibrated. Readjustment is not recommended without precise test equipment. *See* Figure 8-8 on page 76.

6. Select the cable length range compensation with jumpers **J1** and **J2**, located on the VPD-SBEQ submodule. *See* Figure 8-7 on page 76.

📝**Note**

The **R6** equalization potentiometer on the VEA-6840 (Figure 8-7) is used for continuous equalization adjustments from 0 to 1000 ft (300 m).

.
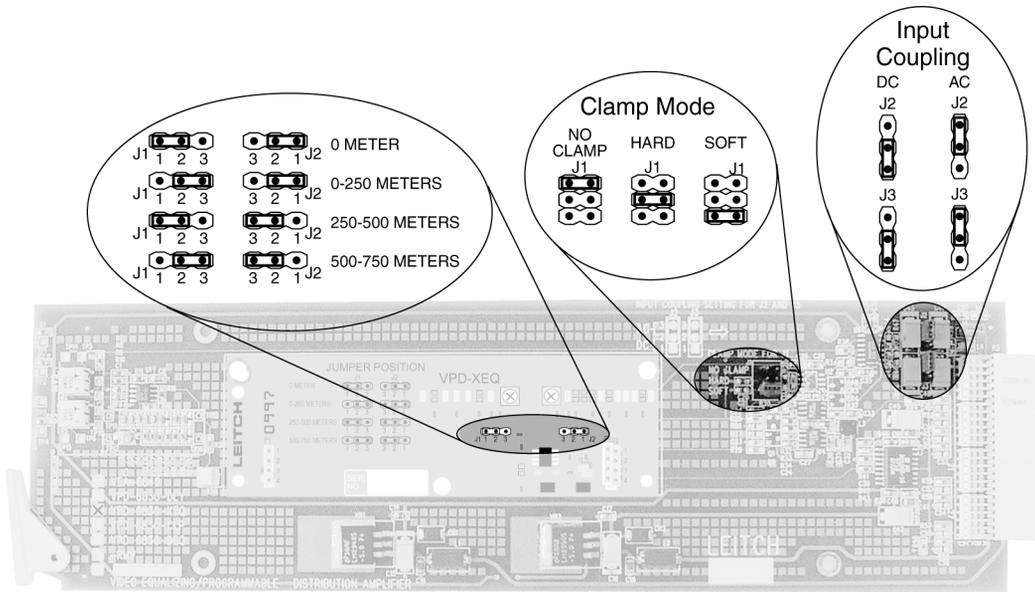
Figure 8-7. VPD-6830-XEQ Jumper Locations
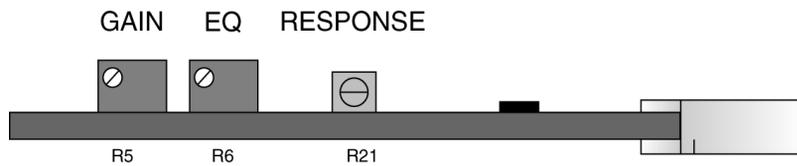
Figure 8-8. VPD-6830-XE Card-Edge View

VPD-6830-DEQ

The VPD-6830-DEQ uses a different type of cable than is used by the main EQ. The following diagram describes the VPD-6830-DEQ signal flow:
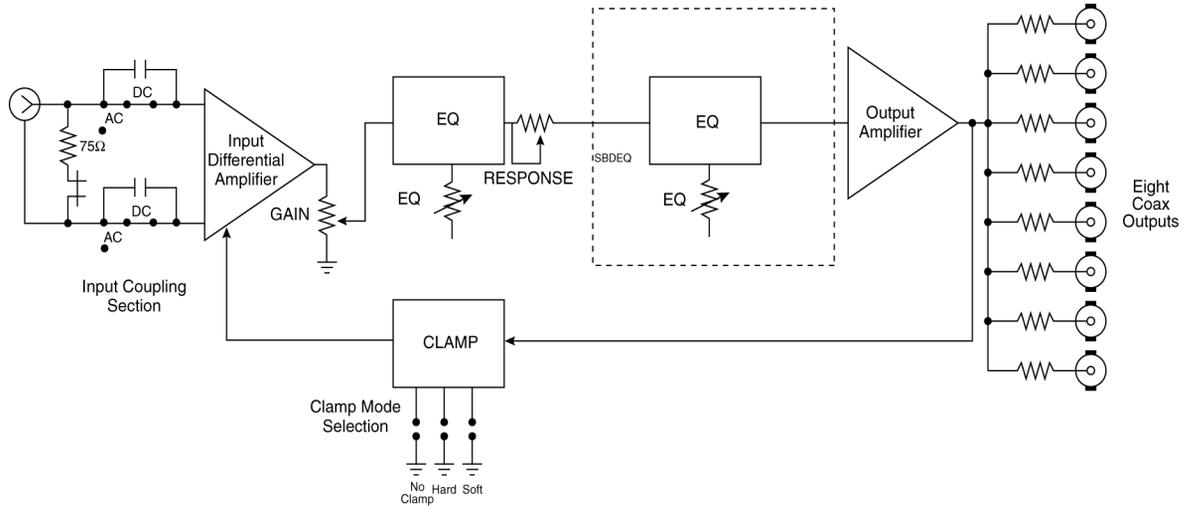
Figure 8-9. VPD-6830-DEQ Functional Block Diagram
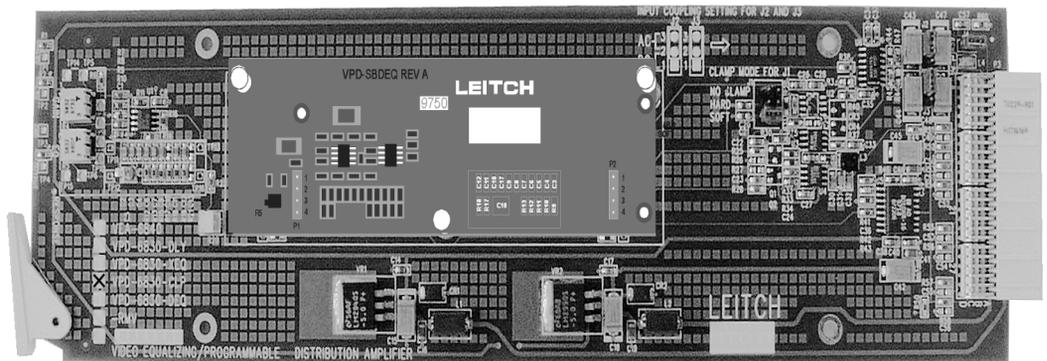
Figure 8-10. VPD-6830-DEQ Top View

VPD-6830-DEQ Specifications

Input

Item	Specification
Video Input Level	1 Vp-p nominal
Maximum Video Input Level	2.5 Vp-p centered at 0 V
Input Impedance	75Ω or high-impedance selectable
Coupling	DC and AC jumper-selectable
Input Return Loss	> 40 dB to 20 MHz
Max. Common Mode Signal Range	28 Vp-p
Common Mode Rejection Ratio	> 65 dB to 10 kHz

Output

Item	Specification
Number of Outputs	8
Level	1Vp-p nominal
Impedance	75Ω
Return Loss	• > 45 dB to 5 MHz • > 40 dB to 10 MHz
Output Isolation	> 35 dB to 10 MHz
Response Variation	< 0.1 dB, 1 to 8 loads at 10 MHz

Performance

Item	Specification
Gain Range	-3 dB to + 3 dB
Line Rate Window Tilt	< 0.25%
Field Rate Window Tilt	< 0.25%
S/N	> 70 dB measured by VM700A
Hum	< 1 mV p-p
Main EQ Range	1000 ft (0-300 m) Belden 8281 cable
Main EQ Response	• < ±0.05 to 5 MHz • < ±0.15 dB to 10 MHz
Second EQ Range	800 ft (0-250 m) Nokia 0.6/2.8
Second EQ Response	• < ±0.1 dB to 5 MHz • < ±0.2 dB to 10 MHz
Differential Gain	< 0.2%
Differential Phase	< 0.2°
Propagation Delay	30 ±1.0 ns

Clamp

Item	Specification
Clamping Accuracy	<± 25 mV
APL Effect	<± 5 mV, 10-90 APL
Time Constant	3 lines and 7 lines selectable

Temperature

Item	Specification
Performance	41° to 104°F (5° to 40° C)
Operating	32° to 122°F (0° to 50° C)

Power Requirements

Item	Specification
Power Dissipation	< 2 W

Specifications and designs are subject to change without notice.

VPD-6830-DEQ

Configuration

1. Set the **Input Coupling** for either AC or DC coupling using jumpers **J2** and **J3**. *See* Figure 8-11 on page 82 for jumper locations.

2. Set the **Clamping** mode on jumper **J1** to either **Soft**, **Hard** or **No Clamp**. *See* Figure 8-11 on page 82 for jumper location.

3. Adjust the gain over a range of -3 dB to +3 dB using the **R5** multi-turn potentiometer in the base module.

   Turn the potentiometer clockwise to increase the gain. *See* Figure 8-12 on page 82.

4. Adjust continuous equalization to the Belden 8281 using the **R6** multi-turn potentiometer in the base module.

   Turn the potentiometer clockwise to obtain more equalization. *See* Figure 8-12 on page 82.

5. Make fine adjustments to the high-frequency response using the **R21** single-turn potentiometer in the base module.

   The high-frequency response is factory-set/calibrated. Readjustment is not recommended without precise test equipment. *See* Figure 8-12 on page 82.

6. Turn-off **R6** on the main board (counterclockwise to minimum). Adjust **R5** on the SBDEQ to obtain the required equalization for Nokia 0.6/2.8 cable.

Note

Before adjusting **R6**, the potentiometer **R5** on the SBDEQ must be set to **zero** (turn **R5** counterclockwise to its minimum adjustment value).
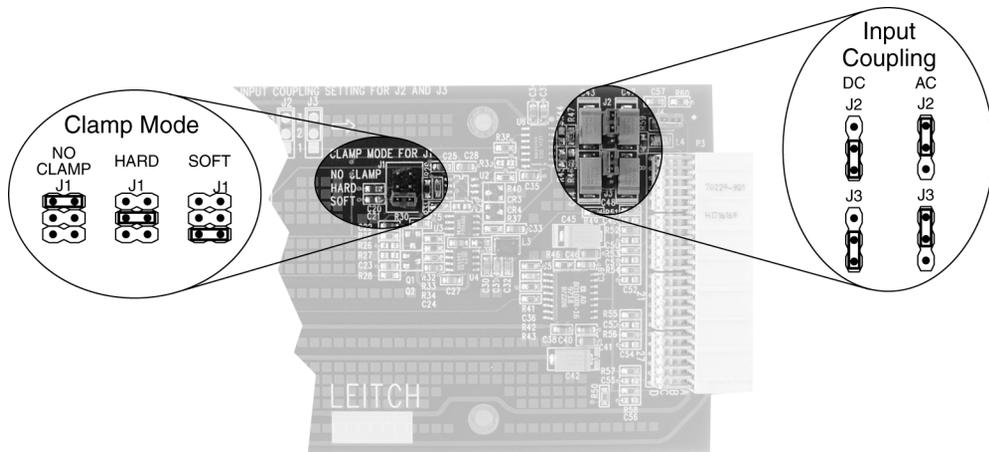
Figure 8-11. VPD-6830-DEQ Jumper Locations
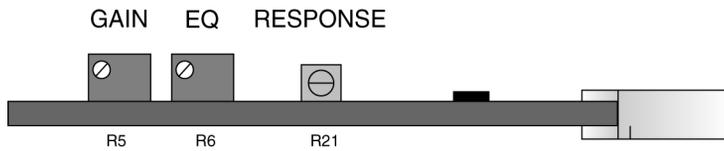
Figure 8-12. VPD-6830-DEQ Card-Edge View

VPD-6830-DLY Series

The VPD-6830-DLY module series provides selectable amounts of delay, up to 1235 ns. The delay submodule includes a delay line with jumper-selectable delay (0 to 235 ns), fine delay adjust (5 ns range), and a socket for an additional fixed delay line that can be one of 200, 400, 600, 800, or 1000 ns increments. Different model numbers allow users to specify how much total delay is desired.

The following diagram illustrates the VPD-6830-DLY240 signal flow:
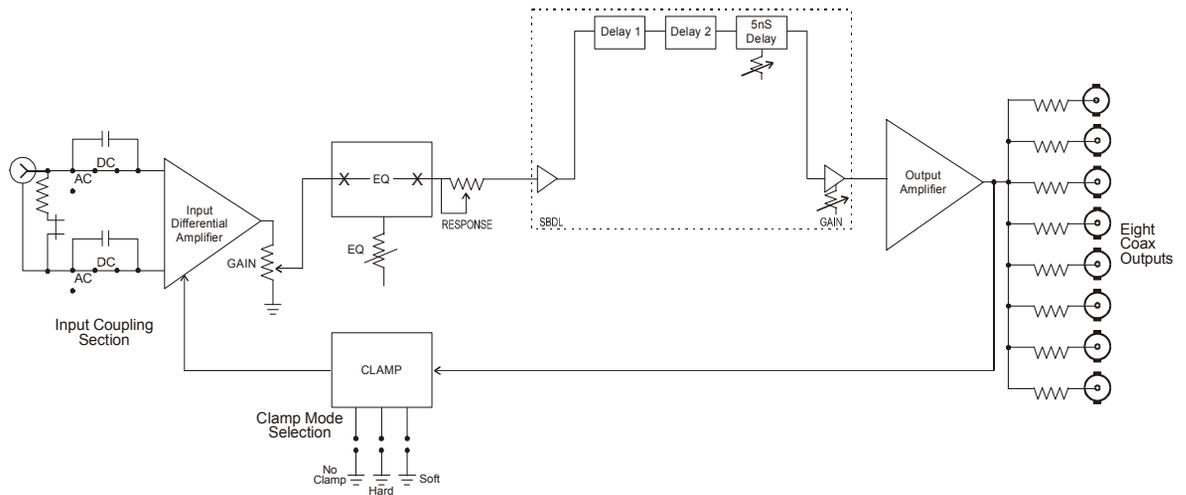
Figure 8-13. VPD-6830-DLY240 Block Diagram
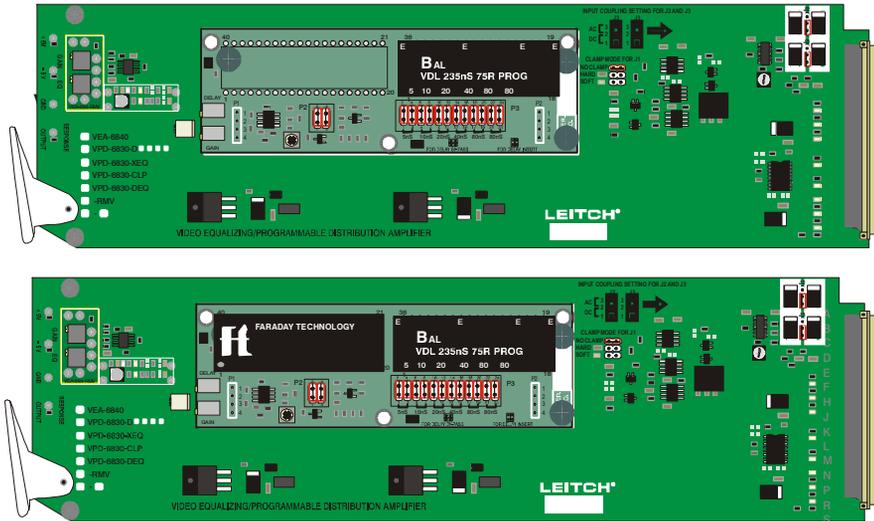
Figure 8-14. VPD-6830-DLY Series Version Comparison

VPD-6830 DLY Specifications

Input

Input	Specification
Video Input Level	1 Vp-p nominal
Maximum Video Input Level	2.5 Vp-p centered at 0 V
Input Impedance	75Ω or high impedance selectable
Coupling	DC and AC jumper selectable
Return Loss	> 40 dB to 20 MHz
Max. Common Mode Signal Range	28 Vp-p
Common Mode Rejection Ratio	> 65 dB to 10 kHz

Output

Item	Specification
Number of Outputs	8
Level	1 Vp-p nominal
Impedance	75Ω
Return Loss	> 45 dB to 5 MHz > 40 dB to 10 MHz
Output Isolation	> 35 dB to 10 MHz

Performance

Item	Specification
Gain Range	-3 dB to + 3 dB
Line Rate Window Tilt	< 0.25%
Field Rate Window Tilt	< 0.25%

Item	Specification
S/N	> 70 dB measured by VM700A
Hum	< 1 mVp-p
EQ Range	• 0 to 1000 ft (300 m) Belden 8281 cable • 0 to 650 ft (200 m) Belden 8241 cable • 0 to 800 ft (250 m) Belden 1505A cable • 0 to 1000 ft (300 m) Belden 1694A cable • 0 to 650 ft (200 m) PSF 1/3 cable • 0 to 800 ft (250 m) NOKIA 0.6/2.8 cable • 0 to 800 ft (250 m) VPM2000 cable
Delay Time	• 30 to 35 ns VPD-6830-D005 • 30 to 270 ns VPD-6830-D240 • 30 to 470 ns VPD-6830-D435 • 630 to 870 ns VPD-6830-D835 • 1030 to 1270 ns PD-6830-D1235
Response	< ±0.2 dB DC-5.5 MHz
Differential Gain	< 0.2%
Differential Phase	< 0.2°

Clamp

Item	Specification
Clamping Accuracy	<± 25 mV
APL Effect	<± 5 mV 10-90 APL
Time Constant	3 lines and 7 lines selectable
Response	< ±0.2 dB DC-5.5 MHz
Differential Gain	< 0.2%
Differential Phase	< 0.2°

Temperature

Item	Specification
Performance	41° to 104°F (5° to 40°C)
Operating	32° to 122°F (0° to 50°C)

Power Requirements

Item	Specification
Power Dissipation	< 2 W

VPD-6830-DLY240

Configuration

The VPD-6830-DLY240 provides adjustable delay from 0 to 240 ns. The additional delay submodule is shown on the VEA-6840 base card in Figure 8-15 on page 91.

To configure the VPD-6830-DLY240:

1. Set the **Input Coupling** for either AC or DC coupling using jumpers **J1** and **J2.** *See* Figure 8-15 on page 91 for jumper locations.

2. Set the clamping mode on jumper **J3** to either **Soft**, **Hard,** or **No Clamp**. *See* Figure 8-15 on page 91 for jumper location.

3. Adjust the gain over a range of -3 dB to +3 dB using the **R5** multi-turn potentiometer in the base module.

   Turn the potentiometer clockwise to increase the gain. *See* Figure 8-16 on page 92.

4. Adjust the equalization using the **R6** multi-turn potentiometer in the base module.

   Turn the potentiometer clockwise to obtain more equalization. *See* Figure 8-16 on page 92.

5. Make fine adjustments to the high-frequency response using the **R21** single-turn potentiometer in the base module.

   The high-frequency response is factory-set/calibrated. Readjustment is not recommended without precise test equipment. *See* Figure 8-16 on page 92.

6. Position the delay submodule **P2** jumpers horizontally across the jumper sockets, connecting pins 2 & 4, and pins 1 & 3.

   Connecting the jumpers horizontally puts them in **Bypass** mode. Connecting them vertically puts them in **Use** mode. *See* Figure 8-15 on page 91 for an illustration of this jumper set.

7. Position the delay submodule **P3** jumpers either horizontally (**Bypass** mode) or vertically (**Use** mode) across the jumper sockets.

   Jumper **P3** is a six-section, two-position jumper set. This jumper "selects" the desired amount of selectable delay. For each section, there are two jumper positions: horizontal and vertical. The horizontal position is **Bypass** mode, where a designated amount of delay can be bypassed. The vertical position is the **Use** position,

where a designated amount of delay is used to select a total amount of delay. Each vertical jumper set that is used represents the amount of delay which can be added together to equal the total amount of delay of the DA's configuration. *See* Figure 8-15 on page 91 for an illustration and an example showing this jumper set.

8. Adjust the fine delay over a range of 0 to 5 ns using the **R2** multi-turn potentiometer on the submodule. *See* Figure 8-16 on page 92.

9. Adjust the **R12** multi-turn potentiometer on the submodule to compensate gain loss caused by the delay line. *See* Figure 8-16 on page 92.

VPD-6830-DLY Series

Configurations

The VPD-6830-DLY435, VPD-6830-DLY635, VPD-883-DLY1035, and the VPD-6830-DLY1235 series provides adjustable delay from 0 to 1235 ns delay. The additional delay submodule is shown on the VEA-6840 base card in Figure 8-15 on page 91.

To configure a VPD-6830-DLY series module:

1. Set the **Input Coupling** for either AC or DC coupling using jumpers J1 and J2. *See* Figure 8-15 on page 91 for jumper locations.

2. Set the **Clamping** mode on jumper **J3** to either **Soft**, **Hard,** or **No Clamp**. *See* Figure 8-15 on page 91 for jumper location.

3. Adjust the gain over a range of -3 dB to +3 dB using the **R5** multi-turn potentiometer in the base module.

   Turn the potentiometer clockwise to increase the gain. Adjust the equalization using the **R6** multi-turn potentiometer in the base module.

   Turn the potentiometer clockwise to obtain more equalization.

   Make fine adjustments to the high-frequency response using the **R21** single-turn potentiometer in the base module.

   The high-frequency response is factory-set/calibrated. Readjustment is not recommended without precise test equipment.

4. Position the delay submodule **P2** jumpers horizontally across the jumper sockets (connecting pins 2 and 4, and pins 1 and 3) for **Bypass** mode.

   Position the jumpers vertically for **Use** mode when the fixed delay line is installed. *See* Figure 8-15 on page 91 for an illustration of this jumper set.

5. Position the delay submodule P3 jumpers either horizontally (**Bypass** mode) or vertically (**Use** mode) across the jumper sockets.

   Jumper P3 is a six-section, two-position jumper set. This jumper "selects" the desired amount of selectable delay. For each section, there are two jumper positions: horizontal and vertical. The horizontal position is **Bypass** mode, where a designated amount of delay can be bypassed. The vertical position is the **Use** position,

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📝 **Note**

The fixed delay line can be one of the following amounts: 200, 400, 600, 800, or 1000 ns.

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where a designated amount of delay is used to select a total amount of delay. Each Vertical jumper set that is used represents the amount of delay which can be added together to equal the total amount of delay of the DA's configuration. *See* Figure 8-15 on page 91 for an illustration and an example showing this jumper set.

6. Adjust the fine delay over a range of 0 to 5 ns using the **R2** multi-turn potentiometer on the submodule. *See* Figure 8-16 on page 92.

7. Adjust the **R12** multi-turn potentiometer on the submodule to compensate gain loss caused by the delay line. *See* Figure 8-16 on page 92.
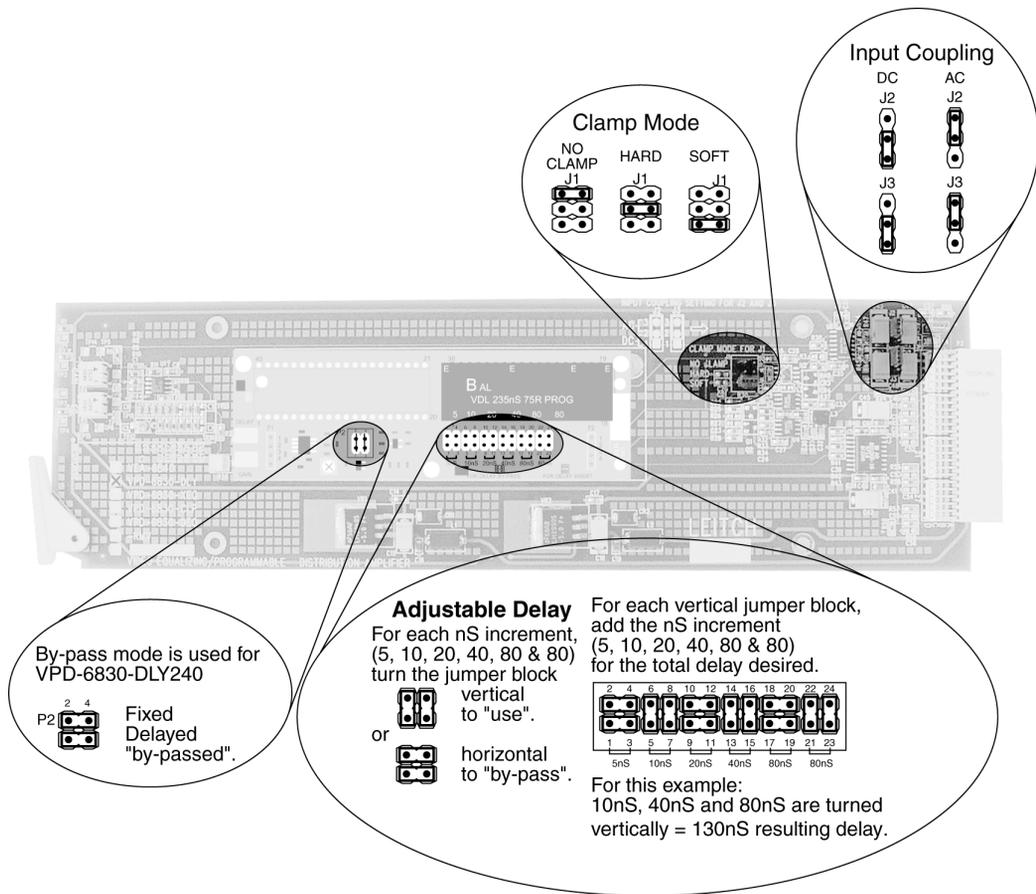
Figure 8-15. VPD-6830-DLY Series Jumper Location
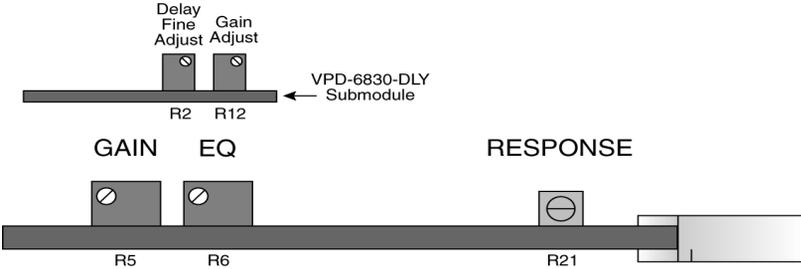
Figure 8-16. VPD-6830-DLY Series Card-Edge View

Chapter 9

VSE-6801 Serial Equalizing Amplifier Module

Specifications

Serial Video Input

Item	Specification
Standards	SMPTE • 259 M-A 143 Mb/s NTSC • 259 M-B 177 Mb/s PAL • 259 M-C 270 Mb/s 525/625
Connector	BNC as IEC 169-8
Impedance	75Ω
Return Loss	>18 dB to clock frequency
Signal level	800 mV ±10%
Common Mode Rejection	30 Vp-p up to 60 Hz
Equalization	Automatic up to: • >22 dB 259 M-A • >24 dB 259 M-B • >30 dB 259 M-C • >25 dB 259 M-D

Serial Video Outputs

Item	Specification
Number of Outputs	8
Standards	• 259 M-B 143 Mb/s NTSC • 259 M-B 177 Mb/s PAL • 259 M-C 270 Mb/s 525/625 • 259 M-D 360 Mb/s 525/625
Connector	BNC as IEC 169-8
Impedance	75Ω
Return Loss	>18 dB to clock frequency
Signal Level	800 mV ±10% (VSE6801-V adjustable 500-950 mV)
D.C Offset	0 V ±0.5 V
Rise and Fall Time	400-700 ps (20 to 80% amplitude)
Overshoot	< 10% of amplitude (all outputs terminated)
Delay Through Device	10 ns typ
Error Indication	• Solid state "Closing Contact" • Polarity sensitive • Reverse Voltage-diode protected • Rated at 20 V 50 mA non-inductive
Power Dissipation	• Positive rail: 0.0 W • Negative rail: 3.2 W • Total: 3.2 W

Specifications and designs are subject to change without notice.

Operation

Jumpers

Jumper	Function
Error Reporting	The on error closing contact can report the following conditions: **J1**- No data **J2**- Equalizer has exceeded the preset cable length
Operating Standard	**J3**- Selects **Composite** operation 143 Mb/s or 177 Mb/s. With no jumper fitted the selection is **Auto**. **J4**- Selects **Auto** standard selection. **J5**- Selects **Component** operation 270 Mb/s or 360 Mb/s.

LED Indicators

LEDs	Function
Error	This indicates that the error condition set in 1 exists.
No Data	This indicates that there is no input data.
Eq Warning	This indicates that the equalizer has reached the preset value. This is not illuminated if "no data" is illuminated.
270	This indicates that the current input standard is 270 Mb/s (D1) This is not illuminated if "no data" is illuminated.
143	This indicates that the current input standard is 143 Mb/s (D2-NTSC). This is not illuminated if "no data" is illuminated.
177	This indicates that the current input standard is 177 Mb/s (D2-PAL). This is not illuminated if "no data" is illuminated.

✎ **Note**

EQ Warning Adjust: This sets the point at which the Max EQ indicator is illuminated, factory set to 700 ft (225 m) of Belden.

LEDs	Function
360	This indicates that the current input standard is 360 Mb/s. This is not illuminated if "no data" is illuminated.

There is one front adjustment on the VSE-6801 (two on the VSE-6801-V) which is factory-set but can be changed if required.

Output Level (VSE-6801-V only): this sets the serial data output level.

Chapter 10

VSE-6802 Serial Equalizing Distribution Amplifier Module

Overview

VSE-6802 is a serial equalizing distribution amplifier for asynchronous serial interface (according to DBV_PI_232 standards). It features the following:

- 1 (one) input to 8 (eight) outputs
- Transformer coupling for both input and output
- In phase output due to the input
- Reclock
- Equalization

The VSE-6802 also provides an automatic bypass switch to a non-reclock path if the input signal cannot be locked. As are the other distribution amplifiers in the 6800 series, the VSE-6802 is equipped with LED indicators for working conditions and a contact closure port for alarm reporting (*See* "LED Indicators", page 100*)*. The VSE-6802 serial equalizing distribution amplifier can be installed in FR68xx/68xx frames.

Specifications and designs are subject to change without notice.
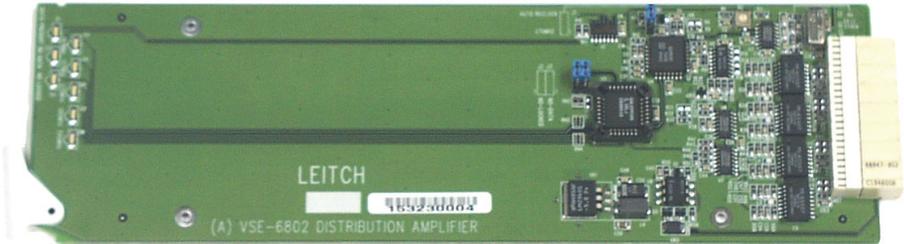
Figure 10-1. VSE-6802 Serial Equalizing Distribution Amplifier

Specification

Operation

Item	Specification
Input Coupling	Transformer
Input connector	BNC
Input impedance	75Ω
Input Return Loss	>18 dB/270 MHz
Input Signal Level	800 mV ± 10%
Common Mode Range	30 Vp-p/ 60 Hz
Output Number	8
Output Coupling	Transformer
Output Connector	BNC
Output Impedance	75Ω
Output Return Loss (typical)	Better than 18 dB from 5 MHz to 270 MHz
Output Return Loss (worst case)	15 dB from 5 MHz to 270 MHz
Output signal level	800 mV ± 10%
DC Offset	0 V
Rise and Fall Time	400-700 ps
Overshoot	10%
Jitter	< 300 ps
Equalization Range	650 ft (0-200 m) Belden 8281 for 270 MBit/s DSI, 650 ft (0-200 m) Belden 8281 for ASI

LED Indicators

LED	Name	Indication
D1 (Green)	Data Present	Data is present at the input.
D3 (Red)	No Data	No data is at the input.
D5 (Red)	No Locked	The input data cannot be locked by the reclock stage.
D2 (Yellow)	143 MHz	The input data is re-locked on 143 MHz.
D4 (Yellow)	177 MHz	The input data is re-locked on 177 MHz.
D6 (Yellow)	270 MHz	The input data is re-locked on 270 MHz.
D7 (Yellow)	360 MHz	The input data is re-locked on 360 MHz.
D8 (Yellow)	540 MHz	The input data is re-locked on 540 MHz.

Jumper and Potentiometer

Jumpers and Potentiometer	Name	Function
J1	Auto Reclock/ 270MHz	This jumper provides the selection of the reclocking mode. In the Auto Reclock mode, the re-clocking circuit locks the input data to one of the five rates automatically. In 270 MHz mode, the reclocking circuit locks the input data to 270 MHz directly, which reduces the re-locking time.
J2	No-lock Disable	When the input data is not locked and J2 is set at the No Lock position, the contact closure port will not report the no-locking alarm.
J3	No-data Disable	When the input data is not present and J3 is set at the N_DATA position, the contact closure circuit will not report the alarm of the data absence out.
R2 (pot)	Threshold Level	This pot is designed for the adjustment of the input data threshold level in the input level detect circuit. Used to eliminate the maximum cable length. (The shorter the cable, the less jitter).

VSD-6801 Serial Digital Distribution Amplifier Module

Specifications

Serial Video Input

Item	Specification
Operating Standards	Transparent • 143 Mb/s SMPTE: 259 M-A (NTSC) • 177 Mb/s SMPTE: 259 M-B (PAL) • 270 Mb/s SMPTE: 259 M-C (525/625 Component) • 360 Mb/s SMPTE: 259 M-D (525/625 Component)
Connector	BNC per IEC 169-8
Common Mode Rejection	30 Vp-p, up to 60 Hz
Equalization	Automatic up to: • 3 dB, 259 M-A • 3 dB, 259 M-B • 3 dB, 259 M-C • 3 dB, 259 M-D

Item	Specification
Input Impedance	75Ω Unbalanced
Input Return Loss	> 18 dB to clock frequency
Typical Cable Length	82 ft (25 m)

Serial Video Outputs

Item	Specification
Number Of Outputs	8
Output Impedance	75Ω unbalanced
Output Return Loss	> 18 dB to clock frequency
Output Level	800 mV ± 10%
Rise and Fall Time	400 to 700 ps measured at 20% to 80% amplitude
Jitter	dependent on input jitter and cable length
Overshoot	< 10% of amplitude (all outputs terminated)
DC Offset	0 V ± 0.5 V
Power Consumption	• Positive rail: 0 W • Negative rail: 2 W • Total rail: 2 W

Specifications and designs are subject to change without notice

VSM-6802 Digital Composite Video Signal Monitor Module

Overview

The VSM-6802 is a monitoring quality digital-to-analog converter for serial digital 4 fsc NTSC signals (4fsc PAL-B signals are *not* supported). This module has one serial digital input and provides four reclocked serial digital and four composite analog outputs.

Any ancillary data is removed from the digital signal, and synchronizing pulses are returned to RS-170A specifications before the composite video is converted to analog.

Specifications and designs are subject to change without notice.

Specifications

Video

Item	Specification
Format Compatibility	Serial Component
Connector Type Serial Input	BNC per IEC 169-8
Input Impedance	75Ω
Type	Unbalanced
Return Loss	>18 dB to clock frequency
Maximum Input Cable Length	1000 ft (300 m) of Belden 8281 or equivalent (350 m typical)
Common Mode Range	30Vp-p up to 60 Hz

Serial Outputs

Item	Specification
Signal Level	800 mV ±10%
DC Offset	0 V ±0.5 V
Rise and Fall Time	400 to 700 ps (20-80% amplitude)
Overshoot	< 10% (all outputs terminated)
Number of outputs	4
Impedance	75Ω
Return loss	>18 dB to clock frequency

Analog Output (NTSC or PAL)

Item	Specification
Number of Outputs	4
Impedance	75Ω
Return Loss	>36 dB to 5 MHz

Item	Specification
Level	1 V
DC Offset	± 100 mV
Frequency Response	± 0.25 dB to 5 MHz
Differential Gain	1.5%
Differential Phase	2°
Chrominance-Luminance Delay Inequality	< ± 10 ns
Total Power Dissipation	• Positive rail: 2.2 W • Negative rail: 2.8 W • Total: 5.0 W

Installation

The VSM-6802 Video Signal Monitor can be installed into a 6800 series, FR-7001 series, or FR-7000MB MIX BOX series frame. When the VSM-6802 module is installed into an FR-7001 series or FR-7000MB MIX BOX frame, a matching back box module is installed on the back of the frame. When this module is installed into a 6800 series frame, only a back panel overlay is required.

The back box is used when the VSM-6802 module is installed into either an FR-7001 series or FR-7000MB MIX BOX frame

This overlay is used when the VSM-6802 module is installed into a 6800 series.
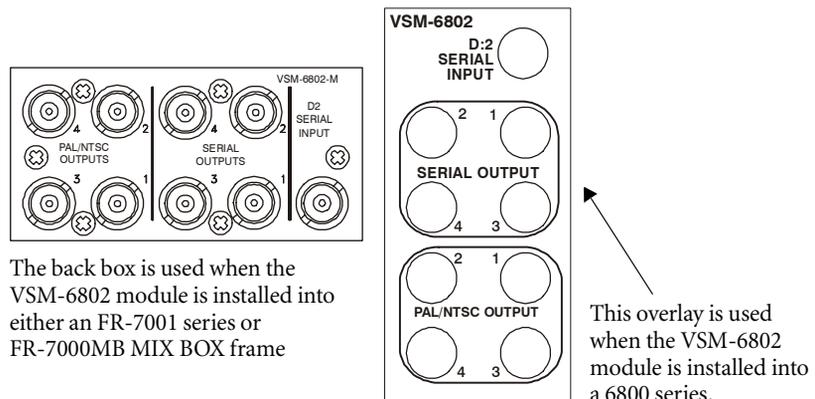
Figure 12-2. Back Module and Overlay

Operation

The two LEDs located on the front of the module indicate the status of the incoming data:

- DATA_PRES LED indicates a 143 MHz signal.
- SYN_PRES LED indicates that TRSID has been detected on the input signal.

The **Video Output Level** multi-turn potentiometer is used to adjust the output composite analog video level. Terminate an output with 75Ω and adjust the pot to get a 1 Vp-p waveform.

Chapter 13

VSM-6804 Digital Composite Video Signal Monitor Module

Overview

The VSM-6804 is a monitoring quality digital-to-analog converter and color encoder for 4:2:2 component serial digital signals. This module has one serial digital input and provides four reclocked serial digital and four composite analog outputs. Any ancillary data is removed from the digital signal and synchronizing pulses are restored when the component signal is encoded into composite analog video.

Specifications and designs are subject to change without notice.

Specifications

Serial Input

Item	Specification
Format Compatibility	4:2:2 serial component
Connector Type	BNC per IEC 169-8
Impedance	75Ω
Return Loss	>18 dB from 5 MHz to 270 MHz
Signal Level	800 mVp-p ±10%
Max. Input Cable Length	> 1000 ft (300 m) of Belden 8281
Equalization	Automatic up to > 30 dB, 259 M-C typical
Standard Detection Time	1 second
Common Mode Range	30 Vp-p up to 60 Hz
CFID Input	1 BNC (Jumper select to use serial output BNC)

Serial Outputs

Item	Specification
Number of Outputs	4 BNC
Connector	BNC per IEC 169-8
Overshoot	< 10% (all outputs terminated)
Impedance	75Ω
Return Loss	>18 dB to clock frequency
Signal Level	800 mVp-p ±10%
Jitter	< 350 ps
Rise/Fall Time	700 to 1000 ps

Composite Analog Output

Item	Specification
Standards	NTSC, PAL-B, PAL-M
Number of Outputs	4 BNC
Signal Level	1 Vp-p nominal ± 3 dB adjustable
DC Offset	± 100 mV
Impedance	75Ω
Return Loss	> 40 dB to 5 MHz
Output Quantizing	10 bits (encoding input 8 bits)
Frequency Response	± 0.2 dB to 5 MHz
Differential Gain	< 1.5%
Differential Phase	< 1.2°
K 2T	< 1%
Chroma/Luma Delay	< 10 ns
Chroma/Luma Gain	< 2%
Signal to Noise	> 60 dB RMS to 5 MHz
Cable Pre-Equalization	300 ft (100 m) of Belden 8281
Processing Delay	2.7 µs
Power Consumption	• Positive rail: 2.8 W • Negative rail: 1.6 W • Total: 4.4 W

Installation

The VSM-6804 can be installed into a FR-680X Series mounting frame, a FR-7001 series mounting frame or a FR-7000MB MIX BOX frame. A matching back module is required when installed into the FR-7001 or MIX BOX frames.

This back module is required when the VSM-6804 is installed in a FR-7001 or FR-7000MB frame.

This overlay is required when the VSM-6804 is installed in a FR-680x frame.

Note

There are no frame loading limitations since the module consumes 3.32 W only. Terminate any unused outputs.
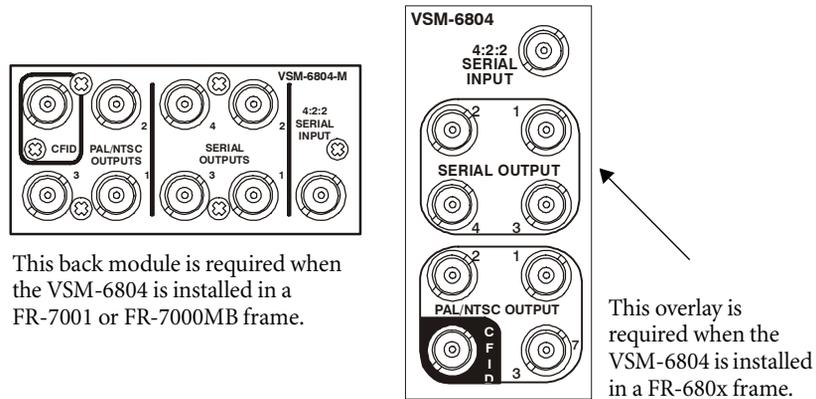
Figure 13-3. Back Module and Overlay

Operation

The operation of the VSM-6804 is controlled by SW2 dip switch and jumpers J1and J2. The three LEDs located at the front of the module indicate the status of the incoming data and line standard (forced by the user or autodetected).

LED Indicators

LED	Indication
525 or 625 LED	On indicates that the module is operational and the incoming signal is properly detected.
Error LED	Steady On and Black Burst test signal at the analog output indicate the absence of incoming data.

Interface Switches

Switch Setting	Function
Standard Select	In the Man position the user can force the output standard to the required mode (in case of an input signal mismatch the module gives the Error LED indication). If the user always operates in only one standard it is advisable to use the Man mode for faster lockup. In Auto mode the VSM-6804 determines and switches to the detected line standard.
Force	This is to select between 525 and 625 line standard modes and active only if Standard Select is in Man position.
525 Standard	This is to select between output standards NTSC and PALM. Since the incoming signal is component digital this selection is always made by the user even in the Auto mode.
Vertical Blanking	In the Pass mode the encoder is transparent in the vertical blanking. In the Blnk mode any luminance and chrominance data is substituted by black. (no setup in case of 525 signals.)
Vblank Chroma	In the Off position the chrominance content is removed from the signal in the vertical banking area, otherwise transparent.

Switch Setting	Function
Chroma On-Off	Toggles chrominance On/Off.
Setup On-Off	Toggles setup On/Off (active in 525 line input mode only).
Mode	In the Test mode, the input signal is replaced by internally generated modulated ramp signal; otherwise the input signal is processed.
Mono Burst	In the Off position, burst is removed if Chroma switch is in Off position; otherwise, burst is present.
Chroma Bandwidth	Selects the -3 dB point of the internal chrominance filter.

VSR-4041 Serial Video Router Module

Specifications

Video Input

Item	Specification
Number of Inputs	4
Connectors	BNC
Input Impedance	75Ω
Return Loss	Better than 16 dB
Equalization	Automatic for 200M at 270 Mb/s using Belden
Common Mode Range	30Vp-p up to 60 Hz

Operating Standards

Item	Specification
Manual Selection From: 143Mb/s 177Mb/s 270Mb/s	 D2 NTSC D2 PAL D1
Number of Outputs	1 bus 2 outputs
Connectors	BNC

Item	Specification
Output Level	Fixed 800 mV nominal variable 600 mV to 1 V
Equalization	Automatic for 650 ft (200 m) at 270 Mb/s using Belden
Output Impedance	75Ω
Return Loss	Better than 16 dB
Output Jitter	± 150 ps measured self-triggered on an analog scope

Switching Point

Item	Specification
NTSC	Line 10
PAL	Line 6
270Mb/s	Line 10
Control interface	Hedco SSC via coax
Control cable length	MAX 1300 ft (400 m)

Specifications and designs are subject to change without notice.

Installation

This module can be installed in any slot of the FR-7001, FR7000MB MIX BOX, or FR-680X series of mounting frames. When housed in an FR-7001 or FR7000MB frame, the appropriate back module must be used.
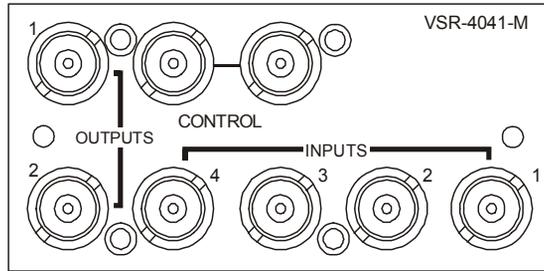

Figure 14-1. VSR-4041-M Back Module

Selecting a Bus

The following jumpers should be set to select the different options.

Jumper	Bus
J1 or none	Bus 1
J2	Bus 2
J3	Bus 3
J4	Bus 4

Selecting an Operating Standard

📝 **Note**

When **Auto** is selected, it will cycle through all the standards before selecting the correct standard. If the system operates on a single, known standard, it is recommended that the user select that standard.

Jumper	Standard
J5	Auto
J6	360
J7	270 (D1)
J8	177 (D2 PAL)
J9	143 (D2 NTSC)

Selecting V-trig (J10)

The V-trig detector circuit uses the embedded line count for 143/177 Mb/s D2 data and the vertical end of active picture information in 270 Mb/s D1 data. If this information is in error or missing, turn the V-trig detector **Off**. However, the control circuit will "time out" and operate when the V-trig is missing.

Selecting Single/Dual Bus (J11)

If **J11** is in the V position, then this module responds to control as a single video bus only. If **J11** is in the V+A position, then this module and an audio module sharing the same control panel will operate as a "tied" video/audio router.

Connection

When using a DA mounting frame, the connectors are as follows:

Output	Input
Input	Input 1, return isolated
Output 1	Input 2, return not isolated
Output 2	Not used
Output 3	Input 3, return not isolated
Output 4	Control in parallel with output 6
Output 5	Input 4, return not isolated
Output 6	Control must be terminated
Output 7	Output 1
Output 8	Output 2

Research indicates that non-isolated inputs have less common mode rejection and, as a result, shorter cable equalizing capabilities.

All inputs satisfy the 650 ft (200 m) performance figure.

Adjustment

Three adjustments are required. To implement these, the following instructions should be carried out:

1. Monitor the output using a deserializer and digital to analog converter and a video monitor.

2. Select a D1 source, as well as 270 Mb/s standard. Adjust **R63** to provide a stable picture and stable sync waveform at TP15. To set the PLL more accurately measure the voltage at TP19.

3. Adjust **R63** clockwise until lock is lost; then turn **R63** counterclockwise until lock is obtained and regained after removal/replacement of the input signal. Record this voltage as VLow.

4. Set the voltage at TP19 to be VLow +0.2 Volts.

5. Select a D2 NTSC source, as well as 143 Mb/s standard. Check that this results in a stable picture and sync waveform at TP15

6. Select a D360 source, as well as 360 Mb/s standard.

7. Adjust **R74** to provide a stable picture and stable sync waveform at TP15. To set the PLL more accurately, measure the voltage at TP19, adjust R74 clockwise until lock is lost, then turn **R74** counter clockwise until lock is obtained and is regained after removal/replacement of the input signal.

8. Record this voltage as VLow.

9. **Set** the voltage at TP19 to be VLow +0.2 Volts

10. Select a D2 PAL source, as well as 177 Mb/s standard. Check that this results in a stable picture and sync waveform at TP15. If a D360 source is not available, adjust at 177 Mb/s instead.

11. Adjust **R110** to provide an output level (if GS9009 is fitted) of 800 mV.

Test Points

Item	Specifications
1	Vertical sync pulse
2	Control data ECL "1" for input 2/4
3	Control data ECL "1" for inputs 1/2
4	Horizontal sync pulse present on D1 for first 8 lines of vertical pulse
5	+5 V
6	0 V
7	Parallel clock.
8	Sync derived from TRS-ID, EAV/SAV
9	Error either No input or the wrong standard or the serial data has errors
10	Carrier detect approx. 2 V for valid input, 0 V for no input, a ramp during auto standard search
11	PLL voltage typically +2.0 V to +2.4 V when locked
12	VTT voltage typically 3 V
13	0 V

📝 **Note**

Other test points, located at the rear of the assembly, are used for factory testing.

Control Panel

The video serial routing (VSR-4041) module uses a Remote Control Panel (RCP-4x1MB). It can be located up to 2000 ft (600 m) from the routing switcher. Connection is carried out via a single coaxial cable with convenient BNC connectors. Any desired number of RCP remote control panels and routing switchers can be chained together by looping the 75Ω coaxial control line from switcher to switcher and/or remote control panels. RCP-4x1MB remote control panels are powered by a small wall transformer.

Control panel push buttons are backlit and removable for labelling.

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